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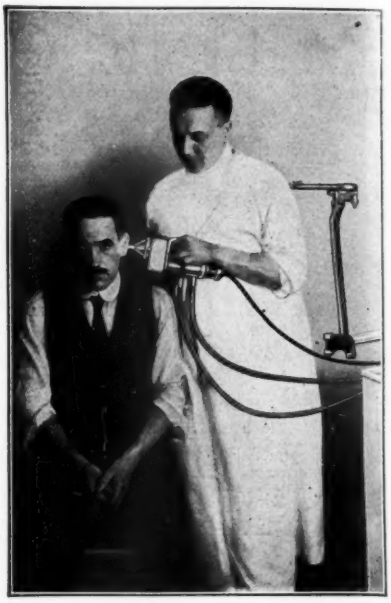

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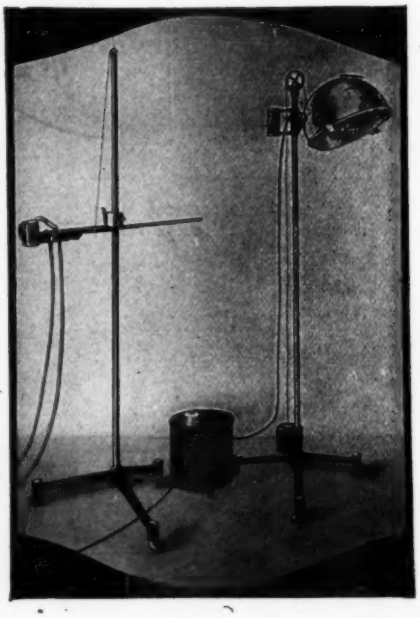

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MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society

VOL. VI JUNE, 1923 No. 6

ORIGINAL ARTICLES

IS PUBLIC HEALTH WORK A MENACE TO REGULAR MEDICINE?*

C. L. SCOFIELD, M.D.
Benson, Minn.

Never before in its history has regular medicine been so beset with dangers both from within and without as at the present time.

Dangers from within are over-commercialization, disregard of the spirit of the code of ethics (in some instances even disregard of the letter) and petty jealousies which lead to acts beneath the dignity of the right minded man in any profession.

The most outstanding danger from without is the army of irregulars, paths, cults and healers.

In the beginning, practitioners of medicine were searchers after truth with small foundations of facts to build upon. The fathers of medicine had established a code which was idealistic. The devotee of the healing art gave freely of his knowledge and effort without regard for returns, which, in a majority of cases, amounted to a bare existence. This condition obtained until quite recently. Since physicians have abandoned this practice and are now demanding and receiving fees that enable them to live as well or better than the average of men and assume a position of respect in the community, they have been envied and imitated by many who are not willing to spend the time and study, or who are not mentally able to attain the high standards demanded by regular medicine. In order to accomplish their ends, which are essentially financial, they have resorted to prejudice—an appeal to class hatred and dishonesty.

The human being as he descended from his savage progenitors has had incorporated into his being certain characteristics and attributes which are as much a part of him as are the organs of his body. Faith, hope and charity are predominant; a belief in visions, modern miracles, sorcery and incantations is not uncommon and superstition is rife. These attributes have made him an easy prey when dealing in subjects in which he is not learned.

Regular medicine has had its profits from this condition, but the physician has not exploited his fellow man to any extent. The irregulars are using this failing as their principal stock in trade and are reaping a harvest of good money from pleasant work, giving very little benefit and leaving the hard, dirty, unpleasant, nerve-racking and poor-paying work for the regular practitioners. He takes from the regular practitioner that which by right of education and ability belongs to him. This is all bad, but this man is not a real menace to regular medicine because he will not last.

It has been ten years or more since we began to hear about state medicine. It was an indefinite thing then; now it has approached so near that it must be faced immediately, understandingly, and with a clean-cut plan for combating it. The policy of indifference, and later the panicky condition of mind which has characterized most of our movements and led us to strike out blindly at friend and foe alike, will not do. State medicine is not the subject of this paper, but public health, if foolishly handled, may be in the same class and can come dangerously near being as much a menace as state medicine.

The question, "Am I my brother's keeper?" is no longer a question. Almost the entire civilized world is to some extent reaching out to help those less fortunate than themselves. Whether it be a kind word to the lonely, a warm garment for the orphan at our gate, or food for the Near East, we have all assumed the helpful spirit.

Few subjects can have a stronger appeal than sickness. The suffering of the individual and his

*Presented at the fourth quarterly meeting of the Central Minnesota Medical Society, Willmar, Minn., December 7, 1922.

family, the hardships that so often accompany and follow it, death, helpless orphans left without proper protection and care—these are only some of the long train of heart-breaking events. The question is, what are we to do about it? To cure the sick is not the correct answer. It is—to prevent sickness. Public health is prevention of sickness and disease. Is prevention of disease a menace to regular medicine? Are we in the same class with the barkeeper who in saloon days ordered from his place the man who tried to persuade the drunkard that he had had enough? The desire to prevent disease is as natural in the individual as the desire to prevent suffering from any other cause—from hunger, from cold due to insufficient clothing or poor housing, from the consequences of lack of training, mental and physical. Sociology, which is the study for the betterment of the mentally and physically deficient, has grown to be an immense power for good, and like all good things it has great possibilities for harm, if not wisely administered. The number of people supporting welfare work is large, and the medical profession is only a very small part of it, but no single unit in its composition is so important as the men in regular medicine. Theirs is the duty of giving the expert advice so necessary to its wise functioning. Are we going to give our efforts wholeheartedly to this work, or will we let it drift into the hands of impractical dreamers and know-it-all professional uplift workers? It is up to us! Disease with its attendant conditions is an inseparable part of sociology, and *state medicine is sociology gone mad.*

The prevention of disease did not become in any way possible until its cause and nature were known. Vital statistics were necessary before its accomplishments could be measured. It is a matter of common knowledge that the death rate from the communicable diseases is on the decline. Tuberculosis at the 1872 death rate (the year that the State Board of Health began functioning) would in 1921 have caused 2,700 deaths, taking into account the increase in population. The actual number was 1,872. The five diseases, tuberculosis, typhoid fever, smallpox, scarlet fever and diphtheria—figured in the same manner, would have caused 5,308 more deaths in 1921 than actually did occur. These results have been made possible almost entirely by the work of men in regular medicine. A few men have been as helpful as barnacles on a ship. Sociologists know these facts; they know who did it; they know that disease is, much of it, preventable—that health is a purchasable commodity. They know that the records of the draft boards show that 21 per cent of what should have been our most perfect physical manhood was rejected as unfit for service and that 49 per cent showed defects. They know that these defects could many of them have been prevented if taken in childhood, and they have become impatient of results. They came to regular medicine—not to any of the paths, cults or healers; they came to regular medicine and said, "Let us lend a hand, guide us, and, working together, we will accomplish greater things." What occurred? We did not respond. They asked us to lead. We failed them and they have fallen into the hand of professional uplifters, who have made and are making more soft jobs for themselves. They have subsidized the nurses we have trained in an attempt to bridge over their ignorance. They have come between the people and their natural and legitimate advisers in health matters—the family physicians. The nurse is as dependent on regular practitioners and regular medicine for her usefulness as she can be; yet many nurses are drifting into the camp of the enemy, ships without a rudder. As I see it all, the man in regular medicine has not been awake to his duties, possibilities and dangers. He has been self-centered, tended strictly to peddling his pills and welcoming the newest arrival. The fathers taught us to eschew the worldly things and the sordid, and we have pretty well followed their teachings. We doctors keep out of politics and have not given things outside the practice of medicine the attention that we should have done. We have not given intelligent thought to our dangers and fought them. We are now waking up and have become panicky, and are dodging at shadows and seeing things instead of giving intelligent and constructive thought to turning these things to our use and benefit.

Exactly what has public health done, and what is it doing? Is it a menace to us? How can we turn it to our benefit? What is the correct solution of this problem—not of our own making or within our power to stop? This is the question of the hour. The largest single thing that preventive medicine has done, aside from the intangible and unmeasurable thing that we call education, has been to put about 12 per cent of our consumptives

into institutions. This took the business right away from us, and prevented many new cases.

Preventive medicine has lowered the death rate from all communicable diseases. It is trying, by teaching proper living, to stop the increase in organic diseases.

Accepting the statement that the child is the father of the man, preventive medicine is attempting to improve the living and growing conditions of the child by providing for proper housing, food, clothing, exercise, and living in general. Cure or improvement of defects, prenatal care of mothers, control of defectives, are only a few of the things it is doing.

If all sickness could be stamped out right now, those of us who have not profited by the war and other circumstances, and laid by a competency, might have to seek other employment. If a reasonable number of health aims are accomplished, the number of physicians required will not, I believe, be smaller than at present. Our physical machines will always be abused, the autos and airplanes will always bump into us. Unavoidable bad health conditions will always exist. We will always go out on a "bat" and overeat and dissipate generally. People will always need to be *cured*. Rules of disease prevention and general well-being will always require interpretation and elucidation on the part of the physician, and people will be paying us for keeping them well as gladly as they are now paying us for curing them.

Bitter complaint has been made by the profession of methods adopted and work already done. Much of this criticism is unjust and inexcusable for the reason that those making it have not made a sufficient investigation to form an intelligent opinion.

Regular practitioners have been referred to as "medical doctors." This in the same way that we refer to dirt farmers. Public health in Minnesota has never gotten out of the hands and control of medical doctors. Eight of the nine members of the State Board of Health, all members of the Tuberculosis Commission, are doctors, and a majority of the seven members of the Executive Committee of the Minnesota Public Health Association are doctors. It has taken strenuous efforts to keep the latter organization under medical control. To neglect this organization and allow it to get out of hand would be harmful and even dangerous.

The men in charge of these activities have never been unmindful of the interests of the regular practitioner. You have not always agreed as to the wisdom of their methods. Doctors are not prone to agree. No group of men can take care of your interests without your active coöperation.

Bitter and senseless criticism has sometimes been visited on the nurses. Sometimes criticism was to some extent merited, but more often the trouble was due to the neglect of the physician himself. If he had not left the direction of her work to some club, but had taken pains to learn the needs, and then had coöperated with and directed her efforts, perhaps he would have had less reason for complaint. As poorly as the work already done has been, it has resulted in sending to the dentist lots of bad teeth; to the doctors, diseased tonsils, bad eyes, and an endless line of defects for correction. The man who pats himself on the back and thinks that it was his personality and good looks that brought the business is on the wrong track. It was public health education and work, and the man who has profited by this added business should be the last to consider public health a menace. If we allow this work to get into the hands of dreamers and professional uplifters, we will see free treatment clinics and some of the other evils of state medicine. Public health must stop with education (the word education considered in its broadest sense) and the care of the indigent. When this work is done under the intelligent direction of medical men, it will be a benefit rather than a menace to regular medicine.

TRAUMATIC RUPTURE OF THE NORMAL SPLEEN*

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Medical literature is sporadically dotted with brief case reports of the traumatic rupture of the spleen. This condition is variously and frequently designated as closed, concealed, subcutaneous, subparietal, "rupture produced by blunt force," and "rupture produced without external signs." This catastrophe is fortunately not of every-day occurrence. The general surgeon may but rarely be called upon to treat one. Nevertheless the general interest in this serious condition lies, first, in the

*Presented before the annual meeting of the Minnesota State Medical Association, Minneapolis, October, 12, 1922.

fact that it invariably occurs without penetration of the abdominal wall; second, in its increasing frequency, due, no doubt, to the universal use of the automobile and the many accidents incidental thereto; third, in its grave prognosis and exceedingly high mortality rate; and, fourth, in its proper management, which calls for a display of the keenest diagnostic and surgical skill. The very serious nature of these injuries, and the disastrous results following failure to correctly recognize them, justifies the critical analysis of this infrequent subject, both from a diagnostic and surgical point of view.

The literature has been carefully collected and reviewed by Bessel-Hagen,[1] Berger,[2] Brogsetter,[3] Carstens,[4] Hörz,[5] and others. Over five hundred cases of ruptured spleens have been reported since the fifteenth century. At that time Celsus[6] first described it. Morgagni,[7] in 1765, collected eighteen cases of the subcutaneous rupture of the spleen. A very large majority of these, however, belong to the pathological group, malaria, typhoid, and anemia being the most common causes. Edler[8] claims that the subcutaneous type of rupture is more common than the open. He found out of 160 cases that 51.8 per cent were subcutaneous in character and 48 per cent were "open," such as the stab or gunshot. Berger,[2] who reviewed all the cases up to 1902, believes the former to be three times as frequent as the latter, and that the frequency of rupture of the spleen, as compared with the same injury to other solid viscera, was as follows: rupture of the spleen, 20 per cent; kidney, 22 per cent; and of the liver, 37.5 per cent. In 1906, Hörz,[5] reported thirty-five cases. In 1908, Brogsetter[3] reported a series of forty-seven cases of rupture of the normal spleen. Barnes,[9] in 1914, collected thirty-one, also of the normal spleen, to which he added one of his own. Willis,[10] in 1917, was able to add fifty-seven, including his own four.

The youngest patient on record in whom a ruptured spleen due to trauma was found was a "new born," dropped on the floor in a precipitate labor (Simpson[11]). The oldest patient on record was aged fifty-seven, the injury resulting from a kick in the abdomen (Madlener[12]). There is a much larger number of these injuries in children and young adults than is ordinarily supposed. This, I believe, is due to the recklessness and adventurousness of the younger generation. The decrease in number with age has been ascribed by one author as being due to the atrophy of the spleen. In this series of 128 cases, including seven reported by the author, the following distribution of ages was found:

Age	*Number of Cases*
1 to 10	23
11 to 20	37
21 to 30	29
31 to 40	15
41 to 50	8
51 to 60	4
Not recorded	12

From the above data it can be seen that one-half of the cases occurred in children and young adults up to twenty years.

Out of 127, 104 or 81.8 per cent occurred in males and twenty-three or 18.1 per cent in females. This preponderance of injuries in males is obviously due to exposure to hazards.

The spleen is perhaps the most friable of all the abdominal visceral organs. Its rather superficial and somewhat fixed position, under the ribs, its tendency both physiologically and pathologically to engorgement, its fragile texture and thin capsule, are reasons often given for its liability to rupture when traumatized. All forms of external violence may produce a laceration. As is well known, in the majority of cases it is the rapidity and velocity of the blow, rather than the size and shape of the agent causing the injury, that is of etiological importance. The more rapid the blow, the less time the abdominal muscles have to place themselves on guard in order to protect adequately the underlying organs. While a slight trauma may and has produced these injuries, trauma of the normal spleen is usually due to severe inflictions of a degree sufficient to produce other accompanying injuries. In this series we found the most common etiological factors in the order of their frequency to be as follows:

	Number	*Per Cent*
Fall	43	34.1
Run over	35	26.9
Blows	23	18.2
Crush	10	7.9
Strain	1	0.7

In one case a fall of only seven feet was necessary to produce symptoms (Pitts and Ballance[13]). In another case, cited by the same authors, a cricket ball pitched by a boy of ten years was the offender.

Chart 1 shows that the symptoms in general are those of internal hemorrhage. The rapidity of the

onset and the degree of bleeding vary greatly in different cases. In some death ensues within a very short time, on account of the rapid and great loss of blood; while in others small subcapsular tears and clotting postpone alarming symptoms for hours or even days. Shock, occasionally mild, more often severe, with its accompanying symptoms of subnormal temperature, rapid thready pulse, pallor, cold perspiration, clammy skin, and falling blood pressure, is usually the first manifestation. Pain is the first and chief complaint of the patient. It slowly increases, frequently is localized in the splenic region, but often throughout the whole abdomen, and is intensified by bodily movements, deep respiration, or cough. Later the patient complains of thirst, and shortly thereafter of air hunger. One is immediately struck by the pallor, the blanched lips, and the colorless appearance of the mucous membranes. The facial expression is anxious, and soon the subject becomes restless. Temperature may at first be subnormal, later rising above normal. Respirations soon become rapid, and are usually shallow and thoracic. The pulse is at this time a very important sign, diagnostically as well as prognostically. Increasing tachycardia goes hand in hand with continuous loss of blood, and is a significant sign. The board-like rigidity of the recti muscles is of no less importance. With few exceptions its presence (constant and marked), was emphasized by every author. Like the pain, it may be confined, more marked over the left rectus muscle and region of the spleen, or it may be and often is present over the entire abdomen. Tenderness is here always found associated with pain and rigidity. Another very important and frequent sign is shifting dullness in the flanks. This is dependent upon the amount of free or clotted blood in the abdomen. Vomiting is occasionally present, and when so is not of the recurrent type as seen in rupture of the intestine. Distention of the abdomen when present is not usually marked. Elliott[14] lays stress on the value of costal resistance or the force encountered in depressing the various segments of the costal arch toward the vertebral column as an important diagnostic sign. Other authors believe pain in the left shoulder or radiating toward it is of great significance. In our series of seven cases it was not recorded. In many of the collected cases, the history and details were very meager. I was, however, able to find the following distribution of signs in this series, including our seven:

	Number	*Per Cent*
Rapid and increasing pulse rate	73	57.02
Tenderness of the abdomen or flanks	71	55.4
Pain, local or general	67	52.3
Rigidity of the recti	65	50.7
Flank dullness	61	47.6
Pallor	51	39.8
Shock	44	35.9
Vomiting	35	27.7
Dyspnea	15	11.7
Restlessness	13	10.1
Pain in the left shoulder	10	7.8

In general the predominating symptoms in this condition are those due to hemorrhage.

No symptom or set of symptoms is pathognomonic. Because of this a positive preoperative diagnosis is rarely possible. It should, however, be made provisionally, and early, after a careful and deliberate consideration of all the facts connected with the particular case, such as the history of the injury of the upper abdomen, particularly of the left side; shock; abdominal pain, increasing in intensity; marked resistance and rigidity of the abdominal muscle with tenderness, more especially over the splenic region, with or without dullness in the flanks and other signs of hemorrhage. The absence of bruises, abrasions, discolorations, and ecchymosis should never mislead one, nor should the diagnosis be allowed to be obscured by other frequently accompanying severe injuries. Among such as found in this review may be mentioned nine in whom fractured ribs were found, seven sustaining fractures of other bones, five with accompanying kidney injuries, four with retroperitoneal hemorrhage in the left kidney region, two with liver lacerations, two with ruptures of the pancreas, one with a contusion of the pancreas, two with injuries to the lungs and resulting hemothorax, one with a laceration of the stomach, one with a rupture of the aorta, and many others with minor bruises, contusions, and scalp wounds.

Up to the end of the eighteenth century, all cases of rupture of the spleen were considered absolutely fatal. Sutton[15] showed that occasionally this is not so. He reports having seen in the museum of the Saint Bartholomew Hospital the spleen of a woman who had previously fallen from a window and had broken her femur. Ten days later at post-mortem it was shown that her spleen had been torn across and the torn surfaces had united. There was an encapsulated collection of blood around the organ.

He likewise described another case, where a man had the left side of his abdomen ripped out by a boar, causing the spleen to protrude. The attending physician could neither make out the nature of the organ, hanging out of the wound, nor replace it. Nearly one month later the wound healed, leaving the spleen on the outer surface, in which condition it resembled a tam-o'-shanter cap. Another surgeon, who then saw the case, tied the vessels and removed the spleen. The prognosis depends in a large measure upon the time elapsed between the infliction of the injury and the proper treatment thereof, and is very often made more grave, as it was in our series, by other serious accompanying injuries. The cause of death is usually hemorrhage. Without surgical treatment, the mortality has been placed at 95 per cent. In this series there were three without surgical treatment, all of whom died. In one the result was not stated. In the other 124, operated upon, there were twenty-seven deaths, or a mortality of 21.7 per cent. Splenectomy was performed upon 106 patients, of whom eighty-three or 78.3 per cent recovered and twenty-three or 21.6 per cent died. Fourteen were treated by tamponade (gauze packing), with the result that twelve or 85.7 per cent recovered and two or 14.2 per cent died. Of two treated by suture and tamponade combined, both died. One with suture and partial splenectomy recovered, and one with suture alone died. As the mortality incidental to this condition depends also on the time of the surgical treatment following the onset of the injury, as well as the surgical technic, I have tabulated the results of this series as follows:

RELATION OF TIME OF OPERATION TO MORTALITY

Hours	*Operations*	*Recovered*	*Died*
0- 1	6	3	3
1- 6	28	23	5
7-12	12	10	2
13-24	22	18	4
25-48	8	7	1
49-72	3	2	1
73-96	1	0	1
Days			
5- 8	5	1	4
9-15	3	3	0
16-31	1	1	0
Not stated	39		

Too much importance should not be attached to the above data, however, for not only the technic and the seriousness of the accompanying injuries but also the condition of the patient at the time of the operation must be taken into consideration.

Treatment must first be centered upon the shock, in which state the subjects are usually found and rushed to the hospital. If treated with heat, morphine, transfusions, and fluids, the patient often shows at least temporary improvement. Prompt action is necessary. Watchful waiting, procrastination, hoping for a change for the better, under the guise of miscalled conservative or symptomatic treatment, imperils success. Loss of every hour now makes recovery less probable. It is better to operate a doubtful case and find perhaps only some slight injury than to permit the sacrifice of a life "by trusting to luck." In order to lose no precious moments, all preparations for operation should be made at once. Local anesthesia alone should be the first choice; and, combined with nitrous oxide, the second. Transfusions of matched blood, if possible, or the intravenous injection of normal saline solution, should be given during or immediately following the operation. Splenectomy, first performed successfully for traumatic rupture in 1893 by Riegner,[16] has steadily gained favor, and is now universally recognized by most authorities as the standard treatment. Not only is it the most rational and certain method of stopping the hemorrhage but also the quickest. Suturing or tamponing of the spleen is not to be relied upon, as proper suturing compels the cutting through of the soft texture of the organ and thus prevents an approximation of the divided edges with sufficient tightness to check the bleeding; while tamponing, which may be of value temporarily, leaves the insidious danger, upon its removal, of a recurrent hemorrhage (Dalton[17]). Given a case with the history of severe injury involving the left hypochondrium especially with the slightest indications of internal injury to the spleen, I would advise an immediate exploration of the abdomen. Time does not permit a detailed description of the technic of splenectomy.

The following protocols of cases described below are taken from the records of the Minneapolis General Hospital, and occurred on the services of the various staff members of the surgical department during a period covering the last five years.

Case 1. D-3397. Female, age 15, admitted August 14, 1917, at nine-thirty P. M., with a history of having been injured in an automobile accident, the details of which were not learned. Upon her arrival at the hospital (one half hour following the accident), she was conscious and in shock. Her temperature was 100, her pulse 112, and her

respiration 22. A provisional diagnosis was made of a fracture of the right femur and internal hemorrhage. One hour after admisison the patient was taken to the operating room, and under a general anesthetic of ether the abdomen was opened and found full of blood, the bleeding coming from a ruptured spleen and a ruptured pancreas. Both of these organs were sutured, and the spleen further fortified against active bleeding by tamponing. No transfusion of blood was attempted. The patient failed to rally from the operation.

Case 2. F-2537. Female, age 21, admitted April 25, 1920, at 1 P. M. She was conscious, but her condition was stated as being very serious. The history, as given by witnesses, was that an automobile had run over her one-half hour previous to her admission to the hospital. The wheels passed across the abdomen. She was in severe shock and very weak. No external signs of injury were evident. She complained of pain in the right shoulder, and of a great deal of pain in the abdomen, which was rigid and tender. Pulse was rapid and thready. Pallor was marked. A provisional diagnosis of a probable ruptured bowel was made. On the second day following the accident operation, under general anesthesia, was performed. The abdomen contained much free blood, the source of which was found in a lacerated spleen and many small ruptures in the liver. Tamponing of the spleen controlled the hemorrhage. Transfusion was given (400 c.c.), but in spite of this and other stimulants the patient died the following morning.

Case 3. F-6085. Male, age 22, admitted November 14, 1920, at 2:50 P. M. with a history of having been caught and pinned under an automobile truck. The patient was in profound shock, and practically unconscious. Several scalp wounds and a fracture of the upper and middle third of the left femur were present. Under stimulants his general condition seemed to improve. The radial pulse was very rapid, and the heart tones very weak. Respirations were shallow and numbered twenty-four per minute. Pallor was marked and did not improve. No attempt was made to treat the fracture or to do a thorough physical examination. The patient died five hours later. At post-mortem, ruptures of the right kidney, the spleen, and the aorta were found, also scalp wounds, superficial abrasions, and the aforementioned fractured femur.

Case 4. G-4856. Male, age 47, admitted August 18, 1921, at 7:45 P. M., conscious but in shock. Pulse was almost imperceptible at the wrists. A transfusion of 200 c.c. of citrated blood was given. The history was that a popcorn wagon in which he was riding turned over on him. He complained of severe pains in the chest and epigastrium. On physical examination he was found to be tender over the abdomen, more especially on the right side. The whole abdomen was rigid, seemingly more so in the upper right quadrant. His knees were flexed. He refused to be operated upon. His restlessness increased. The respirations were sighing, the blood pressure was 64/22, the pulse rate 122. His condition was steadily becoming worse. At 10:25 P. M., under a general anesthetic, he was operated upon. The abdomen was opened and found filled with dark blood. There was no injury to the liver, but a large laceration of the spleen, several inches in length was disclosed. This was promptly sutured and a solution of saline left in the abdominal cavity. Transfusion was attempted immediately following the operation, but the patient died before it could be completed.

Case 5. G-4211. Male, age 10, admitted July 10, 1921, with a history of having fallen through a hole in a railroad bridge about one-half hour before admittance to the hospital. He was conscious, in shock, and complained especially of the pain in the left wrist and the inability to use his left hand and about the pain in his abdomen. He was cold and his skin clammy. There was present a compound fracture of the left radius, the head of the bone protruding through the skin, a dislocation of the ulna, fracture of the lower third of the ulna, as well as a fracture of the distal portion of the left humerus. The next morning the abdomen was found to be distended, rigid, and tender. Fourteen hundred c.c. of normal saline were given hypodermatically. At 9:45 his abdomen was opened under local anesthesia. Free blood filled the abdomen. The spleen was found torn almost in two. The vessels were clamped and tied, and the spleen removed. Three hundred c.c. of normal saline solution were poured into the abdomen, after which it was closed. Ten ounces of matched blood were given by transfusion, followed by 500 c.c. of normal saline. Later the fracture and dislocation were properly treated. Blood counts were frequently made, showing a hemoglobin of 75 per cent at the time the patient was discharged from the hospital.

Case 6. G-6413. Male, aged 10, injured in an automobile accident. Whether the wheels ran over him or not could not be ascertained. He was admitted at 5:30 P. M. on October 30, 1921, at which time he was very pale, his pulse very weak and rapid, his respirations shallow and rapid. He was able to move his limbs, but showed increased resistance and tenderness over the abdomen. There was no dullness in the flanks. One hour later his pulse was 136, the blood-pressure 100/70, respirations 40. At 7 P. M., 200 c.c. of whole blood were injected into the buttocks. The pulse rate had increased to 150. One hour later it had increased to 170. Six hundred c.c. of normal saline solution was administered hypodermatically. The next morning his blood-pressure was 92/58, the pulse 170, the abdomen tender and rigid. His condition grew steadily worse. He died that same afternoon. The post-mortem diagnosis read: Rupture of both lungs, massive hemothorax, rupture of spleen, small rupture of the liver, and fracture of the rib.

Case 7. G-3216. Female, age 52, admitted May 19, 1921, at 3:30 P. M., with a history of having been injured in an automobile accident. Her condition was serious, and a history of the accident was unobtainable at that time. The patient was pale, restless, and in a semi-conscious state. Her pulse was slow, the heart action feeble. The blood-pressure reading was 70/42. There was a deep scalp wound at the post-occipital region. Her pupils reacted to light and accommodation. Neck and chest findings were negative. The abdominal wall was flaccid, and a bluish discoloration was present over the left iliac crest. Tenderness over the abdomen and flanks was present. Several bruises on the left leg were seen. The following day the blood-pressure was 102/70, pulse rate 106, respirations 28, the tenderness and the rigidity of the abdomen markedly increased, with tympany in the flanks. She appeared very

NO.	AUTHOR	SEX	AGE	ETIOLOGY	SYMPTOMS	ASSOCIATED INJURIES	OPERATION AND TIME AFTER	RESULTS
1	Riegner	M	14	Fall	Shock, pallor, vomiting, rigidity, dullness in flanks	None	Splenectomy 12 hours	Recovery
2	Pierson	M	10	Blow	Shock, rapid pulse, pain in left shoulder and abdomen	None	Tamponade 20 hours	Recovery
3	Trendelenburg	M	45	Blow	Shock, rapid pulse, pain, restlessness, flank dullness	None	Splenectomy 24 hours	Died
4	Trendelenburg	M	35	Fall	Pain, pallor, flank dullness	None	Splenectomy 5½ hours	Died
5	Trendelenburg	M	21	Run over	Pain, pallor, rapid pulse, tenderness, rigidity, flank dullness	None	Splenectomy 20 hours	Died
6	Trendelenburg	M	17	Run over	Pain, pallor, rapid pulse, flank dullness, tenderness, vomiting	None	Splenectomy 5 hours	Recovery
7	Trendelenburg	F	7	Run over	Tenderness, flank dullness	Lacerated kidney	Splenectomy 2 hours	Died
8	Trendelenburg	M	18	Run over	Pain, rigidity, dyspnoea, vomiting, flank dullness	None	Splenectomy 24 hours	Recovery
9	Krabbel	M	9½	Fall	Pain, pallor, dyspnoea, rigidity, tenderness, flank dullness	None	Tamponade 1½ hours	Recovery
10	Perthes	M	18	Run over	Pain, rigidity, flank dullness, vomiting	None	Splenectomy 24 hours	Recovery
11	Gerster	F	4	Run over	Distention, signs of fluid in abdomen	None	Tamponade 48 hours	Died
12	Ballance	M	10	Fall	Shock, pain, tenderness, rapid pulse	Fracture both arms	Splenectomy Not stated	Recovery
13	Delbet	M	9	Blow	Shock, pallor, pain, flank dullness	None	Splenectomy Not stated	Recovery
14	Beck	M	19	Run over	Shock, signs of hemorrhage	None	Splenectomy Not stated	Recovery
15	Madlener	F	10	Fall	Shock, pallor, tenderness, rigidity, flank dullness, vomiting	None	Splenectomy 7 hours	Recovery
16	Simpson	M	27	Fall	Pain, rapid pulse, rigidity, tenderness, dyspnoea	None	Splenectomy 6 hours	Recovery
17	Cohen	M	23	Fall	Pain, pallor, rapid pulse, tenderness, flank dullness	None	Splenectomy 9 hours	Died
18	Blauel	M	12	Fall	Vomiting, rapid pulse, pallor, rigidity, tenderness, dullness	None	Splenectomy 40 hours	Recovery
19	Blauel	M	19	Kick	Vomiting, rapid pulse, rigidity	None	Splenectomy 4½ hours	Recovery
20	Frank	M	30	Fall	Shock, pallor, signs of internal bleeding	None	Splenectomy 24 hours	Recovery
21	Georgi	F	4	Run over	Pallor, rapid pulse, rigidity, tenderness, flank dullness	Skin abrasions	Splenectomy 8½ hours	Recovery
22	Georgi	F	8	Fall	Shock, rapid pulse, rigidity, tenderness, flank dullness	None	Splenectomy 1 hour	Died
23	Riegner	M	16	Crush	Pain, vomiting, flank dullness	None	Splenectomy 4 hours	Recovery
24	Savor	F	31	Crush	Pain, flank dullness, signs of internal hemorrhage	None	Splenectomy 20 hours	Recovery
25	Bardenhauser	M	..	Fall	Shock	Fractured ribs and haemothorax	Splenectomy 11 days	Recovery
26	Heusner	M	17	Blow	Pain, radiating to left arm, pallor, tenderness	None	Splenectomy 9 days	Recovery
27	Jordan	M	23	Fall	Pain, pallor, dyspnoea, dullness in flanks, vomiting	None	Splenectomy 9½ hours	Recovery
28	Dalton	M	55	Kick	Pain, increasing pulse rate, rapid respirations	None	Tamponade twice Not stated	Recovery
29	Loison	M	22	Kick	Vomiting, pain, signs of internal bleeding	None	Tamponade 25 hours	Recovery
30	Parker Syms	M	12	Blow	Pain, signs of intra abdominal injury	None	Tamponade Not stated	Recovery
31	Rehn	F	19	Fall	Vomiting, dullness in flanks, progressively weaker	Laceration of the stomach	Partial splenectomy, suture 5 hours	Recovery
32	Kellog	M	40	Run over	Tenderness, signs of internal bleeding	Fracture of ribs	Splenectomy ½ hour	Died
33	Demoulin	M	51	Kick	Shock, signs of internal bleeding on fifth day	Fracture of ribs	Splenectomy 5 days	Died
34	Roddick	M	..	Not stated	Shock, most pulseless	Fracture of ribs, rupture of kidney	Splenectomy Not stated	Died
35	Veron	M	..	Kick	Vomiting, pallor, rigidity	None	Splenectomy 24 hours	Died
36	Venon	M	..	Kick	Pallor, vomiting, tenderness, signs of internal bleeding	Contusion of pancreas	Splenectomy 21 hours	Died
37	Eichel	M	20	Run over	Rapid pulse, tenderness, flank dullness, dyspnoea, distention	Subcutaneous haematoma, lacerated kidney	Splenectomy 6 hours	Died

NO.	AUTHOR	SEX	AGE	ETIOLOGY	SYMPTOMS	ASSOCIATED INJURIES	OPERATION AND TIME AFTER	RESULTS
38	Eichel	M	23	Fall	Shock, pain, also in left shoulder, dullness in splenic area	None	Splenectomy 8½ hours	Recovery
39	Coville	F	26	Fall	Pain, round swelling under left costal arch	None	Splenectomy 15 days	Recovery
40	Wilms	F	30	Fall	Shock, rigidity, rapid pulse, dullness in flanks	None	Splenectomy 4½ hours	Recovery
41	Karewski	F	11	Crush	Shock, vomiting, dullness in flanks and back	Fracture of clavicle	Splenectomy 30 days	Recovery
42	Plucker	M	..	Fall	Tenderness and dullness in flanks and splenic area	None	Splenectomy 24 hours	Recovery
43	Friedheim	M	4	Run over	Vomiting, pallor, pain, rapid pulse, rigidity, tenderness	None	Splenectomy 4 hours	Recovery
44	Friedheim	M	23	Kick	Pain, pallor, rigidity, tenderness	None	Splenectomy 3 hours	Recovery
45	Borelious	M	48	Run over	Pain, tenderness, pallor, rapid pulse, flank dullness	None	Splenectomy 4 hours	Recovery
46	Houghton and Legg	F	12	Fall	Rapid pulse, pain, rigidity, tenderness	None	Splenectomy 24 hours	Recovery
47	Houghton and Legg	F	7	Run over	Shock, pallor, rigidity, rapid pulse, restlessness	None	Splenectomy 1 hour	Recovery
48	Beaumont and Hausman	M	17	Run over	Restlessness, distention of abdomen	Dislocated clavicle, fracture of scapula	Splenectomy Not stated	Recovery
49	Shield	M	25	Kick	Shock, rigidity, tenderness, dullness in splenic area	Fracture left olecranon, scalp wounds	Splenectomy 3 hours	Recovery
50	Lukis	M	7	Run over	Shock, pallor, restlessness, rapid pulse, tenderness	None	Splenectomy 53 hours	Recovery
51	Pitts and Ballance	M	36	Fall	Pain, pallor, flank dullness, almost pulseless	None	Splenectomy 7½ hours	Recovery
52	Pitts and Ballance	M	10	Blow	Shock, pallor, rapid pulse, rigidity, tenderness, dullness	None	Splenectomy 5 days	Recovery
53	Pitts and Ballance	F	45	Run over	Pallor, almost pulseless, dullness in flanks	None	Splenectomy 24 hours	Recovery
54	Alexander	M	34	Not stated	Pain, vomiting, rapid pulse and respirations	None	Splenectomy 48 hours	Recovery
55	Harrison and Eve	M	..	Fall	Pain and abdominal distention	None	Splenectomy Not stated	Recovery
56	Latouche	M	10	Fall	Pain, distention, rapid pulse	None	Splenectomy 21 hours	Recovery
57	Rendle	M	11	Fall	Pain, rigidity, rapid pulse, flank dullness	None	Splenectomy ½ hour	Recovery
58	Heaton	M	9	Run over	Pallor, pain, restlessness, flank dullness	None	Splenectomy 5½ hours	Recovery
59	Ramstedt		..	Kick	Flank dullness, restlessness, rigidity, pallor, rapid pulse	None	Splenectomy Not stated	Recovery
60	Nost-Kolb	M	38	Kick	Pain, tenderness, vomiting, shock, pallor, dullness	None	Splenectomy 96 hours	Died
61	Noetzel	M	..	Run over	Shock, rapid pulse, dullness over splenic area	None	Splenectomy 3 days	Recovery
62	Berger	M	19	Fall	Pain, pallor, rapid pulse, tenderness, rigidity, dullness	None	Splenectomy 24 hours	Recovery
63	Hörz	M	29	Kick	Pain, pallor, rapid pulse, tenderness, rigidity, anxiety	None	Splenectomy 4½ hours	Recovery
64	Neck	M	16	Blow	Vomiting, pain, pallor, rapid pulse, distention, dyspnoea	None	Splenectomy 48 hours	Recovery
65	Straus	M	17	Fall	Vomiting, shock, pain, rapid pulse	None	Not stated 14 days	Not stated
66	Fontoynot	F	28	Blow	Shock and signs of internal bleeding	None	Splenectomy 2 hours	Recovery
67	Leverenz	M	27	Run over	Signs of internal bleeding	None	Splenectomy 2 hours	Recovery
68	Brogsetter	M	21	Run over	Pallor, pain, rigidity, tenderness, flank dullness, fast pulse	Retroperitoneal hemorrhage	Splenectomy 8 hours	Recovery
69	Elliott	M	13	Run over	Pain, tenderness, rigidity	None	Splenectomy 6 hours	Recovery
70	Haynes	M	9	Run over	Shock, rigidity, tenderness, rapid pulse	None	Splenectomy Not stated	Recovery
71	Brewester	F	6	Run over	Tenderness, rigidity, distention, rapid pulse, vomiting	Bruises of back	Tamponade Not stated	Recovery

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72	Sherwood	M	40	Fall	Shock, pain, rigidity, vomiting, pallor, rapid pulse, thirst	None	Splenectomy Not stated	Recovery
73	Vorwerk	M	24	Blow	Pain, vomiting, pallor, rapid pulse, rigidity, dullness (flank)	None	Splenectomy 3 hours	Recovery
74	Vorwerk	M	16	Fall	Rigidity, rapid pulse, vomiting, tenderness	Bruises	Splenectomy Not stated	Recovery
75	Vorwerk	M	17	Fall	Rigidity, tenderness, distention, shifting dullness (flank)	Contusions, fracture left humerus	Splenectomy 6½ hours	Recovery
76	Vorwerk	M	24	Run over	Tenderness in abdomen and flanks	Abrasions	Splenectomy Not stated	Recovery
77	Vorwerk	M	24	Crush	Pallor, shock, rigidity, tenderness, vomiting, rapid pulse	Fracture of ribs, subcutaneous emphysema	Splenectomy 9 hours	Died
78	Vorwerk	M	14	Kick	Pain, tenderness, rigidity, distention	Laceration of pancreas	Splenectomy Not stated	Recovery
79	Vorwerk	M	50	Run over	Vomiting, pain, distention	Fracture of ribs	Splenectomy Not stated	Died
80	Vorwerk	M	45	Run over	Pain, dyspnoea, shock, rapid pulse	Fracture of ribs	None Not stated	Died
81	Fagge and Mar	F	13	Blow	Pain in shoulder, tenderness, rigidity, rapid pulse, pallor	Bruises	Splenectomy Not stated	Recovery
82	Ross	M	21	Fall	Pallor, pain, rigidity, tenderness, distention	None	Tamponade 24 hours	Recovery
83	Hahn	M	..	Fall	Pain, tenderness, shock, rigidity, tenderness, weak, rapid pulse	None	Splenectomy 6 days	Died
84	Henderson	M	35	Strain	Pain, thirst, pallor, rapid pulse, rigidity, duflness, tenderness	None	Splenectomy Not stated	Recovery
85	Henderson	F	25	Fall	Tenderness, distention, flank dullness	None	Splenectomy Not stated	Recovery
86	Henderson	F	19	Fall	Pallor, shock, dyspnoea, flank dullness, rigidity, rapid pulse	Laceration left kidney	Splenectomy Not stated	Recovery
87	Henderson	M	45	Run over	Shock, rapid pulse, pain, rigidity, shifting flank dullness	Laceration kidney, fracture of ribs	Splenectomy Not stated	Died
88	Henderson	M	35	Blow	Tenderness, rigidity	None	Splenectomy Not stated	Died
89	Jones	M	12	Fall	Pallor, rapid pulse, flank dullness	None	Splenectomy 48 hours	Recovery
90	Jones	M	37	Blow	Pallor, pain, flank dullness, signs of hemorrhage	None	Splenectomy 24 hours	Recovery
91	Clarke	M	52	Fall	Pain, rapid pulse, tenderness, dullness in flanks	None	Splenectomy 7 hours	Recovery
92	Rait	M	32	Blow	Pain, tenderness, rapid pulse, shifting dullness	None	Splenectomy Not stated	Recovery
93	Seheult	M	13	Fall	Pain, tenderness, rigidity, slight distention, tympany	None	Splenectomy 12 hours	Recovery
94	Eisendrath	M	10	Blow	Pallor, restlessness, thirst, flank dullness, tympany	None	Splenectomy Not stated	Died
95	Brewer	M	14	Fall	Pain, vomiting, pallor, rapid pulse, tenderness, rigidity	None	Tamponade Not stated	Recovery
96	Ballock	F	17	Kick	Pain, vomiting, rapid pulse, tenderness, rigidity, dullness	None	Splenectomy Not stated	Died
97	Boulton	M	12	Crush	Pallor, rigidity, tenderness, flank dullness, restless	Retroperitoneal hemorrhage	Splenectomy Not stated	Recovery
98	Mixter	M	25	Blow	Vomiting, tenderness, rigidity, flank dullness	Slight bruises	Splenectomy Not stated	Recovery
99	Gibbon	M	..	Fall	Shock, pallor, rapid pulse, distention, flank dullness	Retroperitoneal hemorrhage	Tamponade Not stated	Recovery
100	Hitzrot	M	7	Run over	Shock, rapid pulse, rigidity, tenderness, flank dullness	None	Splenectomy 4 hours	Recovery
101	Hitzrot	M	14	Fall	Pain, dyspnoea, shock, rigidity, tenderness, rapid pulse	None	Splenectomy 1¼ hours	Recovery
102	Fauntleroy	M	24	Fall	Pain, tenderness, rigidity, pain in left shoulder, thirst	Contusions of chest and abdomen	Splenectomy 3 hours	Recovery
103	Lillienfeld	M	21	Fall	Tenderness, distention, flank dullness	None	Splenectomy 12 hours	Recovery
104	Müsham	M	10	Run over	Pallor, almost pulseless, shifting abdominal dullness	Contusions of chest wall	Splenectomy Not stated	Recovery

NO.	AUTHOR	SEX	AGE	ETIOLOGY	SYMPTOMS	ASSOCIATED INJURIES	OPERATION AND TIME AFTER	RESULTS
105	Walker	M	34	Kick	Pain, tenderness, shock, thirst, rigidity, flank dullness	None	Splenectomy 4½ days	Died
106	Plumptre	M	..	Run over	Shock, pallor, rapid pulse, thirst, distention, tenderness	None	Splenectomy 1 hour	Died
107	Plumptre	M	..	Kick	Pain, pallor, rigidity, tenderness, flank dullness	None	Splenectomy Not stated	Recovery
108	Plumptre	M	..	Blow	Shock, pallor, pain, rigidity, tenderness, rapid pulse	None	Splenectomy 27½ hours	Recovery
109	Palmer	M	19	Fall	Shock	None	Tamponade Not stated	Recovery
110	Livingston	M	27	Run over	Dyspnoea, rigidity, rapid pulse	Abrasions	Splenectomy 22 hours	Recovery
111	Jones	M	10	Fall	Signs of intra-abdominal injury	None	Splenectomy Not stated	Recovery
112	Levy	M	18	Blow	Pain, dyspnoea, vomiting, thirst, pallor, rigidity, tenderness	None	Splenectomy Not stated	Recovery
113	Cam	F	31	Blow	Pallor, pain, rigidity, flank dullness, rapid pulse	None	Splenectomy 4 hours	Recovery
114	Leitner	M	20	Fall	Pain, shock, rigidity	Retroperitoneal hemorrhage	Tamponade 1 hour	Recovery
115	Mulligan and Hennington	M	32	Fall	Pain, in left shoulder, rapid pulse, rigidity, tenderness	Liver rupture	Suture and tamponade 24 hours	Recovery
116	Hutcheson	M	30	Crush	Pain, tenderness, flank dullness, rapid pulse	Left Colles fracture and abrasions	Splenectomy 7 days	Died
117	Barnes	M	19	Fall	Pain, vomiting, rigidity, tenderness	None	Tamponade 24 hours	Recovery
118	Willis	M	28	Crush	Pain in left shoulder, thirst, rigidity, tenderness, dullness	None	Splenectomy 27 hours	Recovery
119	Willis	M	14	Blow	Rigidity, tenderness, pain in left shoulder, flank dullness	None	Splenectomy Not stated	Recovery
120	Willis	M	46	Crush	Pain in left shoulder, tenderness, rigidity	None	Splenectomy Not stated	Recovery
121	Willis	M	15	Auto accident	Pain, rigidity, rapid pulse	Ruptured pancreas	Splenectomy 24 hours	Recovery
122	Robitshek	F	15	Auto accident	Shock, rapid pulse	Contusion of liver	Tamponade 2 hours	Died
123	Rotbitshek	F	21	Run over	Shock, pain, rigidity, pallor, rapid pulse, tenderness	None	Tamponade 50 hours	Died
124	Robitshek	M	47	Crush	Shock, pain, tenderness, rigidity	Rupture of kidney, rupture of aorta, fracture of femur	Suture 3 hours	Died
125	Robitshek	M	22	Crush	Shock, pallor, rapid pulse	Rupture both lungs, haemothorax, fracture of ribs	Not operated	Died
126	Robitshek	M	10	Run over	Shock, rapid pulse, rigidity, tenderness, flank dullness	Fracture of humerus, radius, elbow dislocation	Not operated	Died
127	Robitshek	M	10	Fall	Shock, rigidity, pain, tenderness	None	Splenectomy 16½ hours	
128	Robitshek	F	52	Auto accident	Pain, tenderness, rigidity, restlessness		Splenectomy 21 hours	

pale and slightly irrational. The urine examination showed a trace of albumin and an occasional hyaline and granular cast. At 1 P. M. that day she was operated under a local anesthetic. One quart of clotted blood was removed from the abdomen. The spleen was found lacerated in two places and was removed. Her recovery was uneventful. On discharge from the hospital, five weeks later, her hemoglobin had reached 80 per cent.

As a result of this study, I have arrived at the following conclusions:

1. Traumatic rupture of the spleen occurs much more frequently in males.

2. One-half the cases occur in children and young adults.

3. No pathognomonic symptoms exist. In general, the symptoms are those of hemorrhage.

4. Splenectomy, performed early, is probably the most reasonable and most efficient treatment.

I wish herewith to thank Dr. W. E. List, Superintendent of the Minneapolis General Hospital, for his courtesy in permitting me to examine the records of the above cases.

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DISCUSSION

DR. ARTHUR T. MANN, Minneapolis: It is a pleasure to discuss a paper so clearly and so simply put, so that the ideas presented in it stand out prominently.

An absolute diagnosis of rupture of the spleen is seldom made before operation. When the surgeon sees the case it is primarily one of shock, abdominal injury, hemorrhage. It may be a rupture of the kidney, a rupture of the liver, a rupture of the bowel, and the practitioner must make these differentiations. We have then a set of symptoms common to all these conditions—shock, with a pulse at first slow and feeble, and then becoming more rapid and more feeble as the rate increases; a pinched, pale, clammy face and hands; a slow, shallow respiration. These constitute the symptoms of shock. Then we may have hemorrhage, with a pale, cold, clammy skin, the respirations beginning to increase in rapidity from air hunger; and air hunger is the cardinal symptom of hemorrhage. When the clinician sees the case the rapid and feeble pulse is characteristic; there is a loss of the artery under the finger between beats; the heart pumps a little blood and then the tension is gone. Besides these common signs, we have the local signs. If the local signs are over in the left upper quadrant, the presumption is a rupture of the spleen. That is as close as you can get to it. If the signs are over the upper right quadrant, a little anterior, it is probably rupture of the liver. With rupture of the kidney, we will get bloody urine if we catheterize the bladder. In rupture of the bladder, pain is characteristic. It is more or less characteristic of all these conditions, but the pain is over the spleen in rupture of the spleen and over the bladder in rupture of the bladder. It is over the liver in rupture of the liver, etc. With involvement of these organs, the abdomen becomes hard and board-like. It tries to protect the injured organ inside. In rupture of the stomach or bowel, the board-like rigidity of the abdomen is more pronounced because of the great irritation caused by their contents.

DR. A. R. COLVIN, St. Paul: The ability to discuss a paper of this kind presupposes really a good deal of experience, and the interesting thing is the fact that during a service of 15 years at a hospital rich in traumatism,—the City and County of St. Paul,—I have not seen a case of rupture of spleen except one which was due to a gunshot injury, so that really in a sense I am not competent to discuss the paper. However, I was willing to discuss it from the point of view of abdominal injuries in general.

Because a diagnosis of rupture of the spleen is not usually made before operation. If we wait until all of the abdominal symptoms manifest themselves—hemorrhage and its consequences—operation will not usually be successful, so the point really centers upon an early recognition of a severe enough abdominal injury to warrant immediate surgical intervention.

In cases of abdominal trauma, I have been successful in a few where I have not waited for anything like the classic symptoms of hemorrhage, but have been impressed with the fact, after a thorough study, that the patient is seriously injured. In this present day, development of surgery is such that a simple exploratory laparotomy in severe trauma is a much less risk than waiting for more positive indications.

The question of what one should do when one finds an injury of the spleen seems to be settled by the statistics the doctor has given us. The patient with gunshot wounds of the spleen that I have operated on fortunately recovered, and after taking out the spleen I have wondered if I could not have stopped that amount of bleeding by less heroic measures.

The function of the spleen, of course, is still in doubt. We do not know that it has either an external or internal secretion. It is supposed to deal with blood destruction, and yet it seems to me too important an organ to destroy or remove too readily. Ever since the time I operated on this case of gunshot wound of the spleen and removed it, I have wondered what else one could do in such a predicament again.

In thinking over the material for this discussion and reading of the experiences of others and noting the fact that very often we have an accessory spleen, and that on one occasion somebody operated some time after the spleen was removed, and discovered remnants of spleen tissue engrafted upon the peritoneum.

I have wondered whether, in a case in which one is in doubt, it would be sufficient to ligate the pedicle of the spleen and hope that perhaps through the proper cardinal ligaments of the spleen sufficient blood supply would not be obtained to let the spleen act and go on with its function.

DR. EDWARD BRATRUD, Warren, Minn.: I believe that no one has reported a case of rupture of the spleen which occurred only from muscular trauma. However, believe there are one or two such cases on record. I want to report briefly two cases from records at Warren.

Last November a girl of sixteen tripped on the sidewalk with no apparent injury. She was brought into the hospital in the course of an hour, and her symptoms were those of shock, falling blood-pressure, and a little pain up in the left quadrant of the abdomen, which caused us to do an exploration, and we found a bleeding spleen and the abdomen half-filled with blood. The spleen was removed. This was followed by transfusion and repeated infusions, and she got along very nicely.

The second case occurred about two months ago. The patient was a man, aged 30, who was kicked by a horse over the left kidney. His symptoms were chiefly those of shock, but he had hematuria. We explored his kidney and found it was badly lacerated. We did a nephrectomy, and decided to look into the peritoneal cavity, which we did. We also found a badly lacerated and bleeding spleen, which we removed. We anticipated the shock in this case and gave him the usual treatment, and he got along very nicely. I might add the blood picture in these cases, which we are following up from time to time, is in accordance with the accepted findings.

Dr. E. C. Robitshek, Minneapolis (closing): I wish to thank the gentlemen for their kind discussion. I think Dr. Bratrud is to be congratulated on having successfully removed the kidney and spleen at the same operation. There are only two cases in my series where the kidney and spleen were both removed at the same time. One of these patients died.

I agree with Dr. Mann and Dr. Colvin that a preoperative diagnosis is almost out of the question, because the symptoms of injury to the abdominal organs are very much the same, but they call for an exploratory operation, which should not be delayed. Most of us are willing to procrastinate, and in the meantime the patient becomes worse. I would rather open the abdomen and find a slight injury than sacrifice the patient's life by waiting too long.

PROSTATECTOMY FROM THE STANDPOINT OF THE GENERAL PRACTITIONER*

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As the title indicates, this paper is intended more for the general practitioner than the specialist. I wish to show by analysis of a series of fifty consecutive cases, what we may reasonably promise a patient suffering from prostatic obstruction in the way of cure and a comfortable existence thereafter.

Prostatic obstruction is a disease of middle and old age with definite symptoms of onset, existing for varying periods of time before enough damage is caused by retention of urine to attract the patient's attention to his failing health. Two early symptoms are frequency and slowing up of the urinary stream. A slight difficulty in starting the urine and more or less dribbling at the end of urination will be noted in the majority of cases. Urine may be passed six to eight times during the day and one to four times at night. As time goes on, these symptoms become more pronounced, and often an exposure to cold, a long automobile ride, a full bladder unrelieved will result in more or less complete retention of urine. This acute attack may be relieved by catheterization or such local treatment as may be indicated, only to recur sooner or later on much less provocation than formerly, and will not be so easily relieved. Inability to completely empty the bladder results in a certain amount of constant urinary retention. The retained or residual urine eventually becomes infected, and through its irritant action on the bladder mucosa causes frequent urination. As the residual urine increases in amount a back pressure on the kidneys is produced, which gradually impairs their function. The infected urine may eventually reach the kidneys and through infection greatly increase the danger of kidney complications.

Urinary complaints in men of forty or more should always demand an investigation of the condition of the prostrate, regardless of the fact that the urine may appear normal. Some individuals carry a large residual urine free from pus for long periods of time before it becomes infected. In others, the urine may contain pus from a few cells to large quantities. If there is a palpable enlargement of the prostate, the bladder should be examined for retention. The amount of residual urine is determined as follows: The patient is directed to empty his bladder completely; he is then given an anterior urethral irrigation; the bladder is catheterized aseptically. The urine thus obtained will be the amount of residual. If there be four to six ounces or more, one is justified in referring the patient for a special examination and possible relief of the obstruction by surgical treatment.

Often the patient does not feel sick enough to consider surgical treatment, so he naturally wishes to know what the prospects are for cure; how long he will be confined to the hospital, and how he will get along in after life. In order to determine the prognosis, a study has been made of fifty suprapubic prostatectomies. Analysis of symptoms revealed the following: The youngest case in the series was fifty-six years of age, and the oldest was eighty-two years. The average age was sixty-six and one-half years.

Difficulty and frequency of urination existing from one month to twenty years were the first symptoms noted. Twenty per cent complained of frequency only. Thirty-two per cent complained of difficulty in starting, and dribbling at the end of urination. Forty-eight per cent complained of both

*Read before the Southern Minnesota Medical Association at Mankato, December, 1922.

frequency and difficulty. On admission to the hospital 60 per cent had complete retention, 16 per cent had practiced self-catheterization for periods of from one month to five years. Residual urine varied from 60 c.c. to complete retention and contained pus in varied amounts from a few cells to thick pus drawn off at the end of catheterization.

I wish to emphasize that attempts to enter the bladder forcibly in cases of complete retention by means of metal catheters or sounds should be condemned. It is far better to aspirate the distended bladder suprapubically and remove a portion of the urine. The aspirating needle may be left in situ to keep up a slow continuous drainage of urine until arrangements can be made for suprapubic cystotomy.

PREOPERATIVE PREPARATION

In twenty-two cases the bladder was drained suprapubically immediately on admission. They were cases of complete retention that had been severely traumatized before coming to the hospital by ineffectual attempts to pass rubber or metal catheters. A mushroom catheter was introduced into the bladder suprapubically under local anesthesia. The bladder was immediately refilled to capacity with boric acid solution, and the kidneys were decompressed by slow withdrawal of the fluid. Twenty-three cases were treated by gradual withdrawal through the indwelling catheter. Five cases that could not tolerate indwelling catheter on account of pain and tenesmus required drainage suprapubically. Two cases required a long period of preliminary treatment, for one hundred seventy and one hundred seventy-nine days, respectively. The remaining forty-eight cases varied from six to fifty-two days with an average of twenty days. During the entire preoperative period the twenty-four-hour output of urine and its specific gravity was observed daily. The phthalein test was applied in each case and repeated on one or more occasions until a fairly accurate idea of kidney efficiency was obtained. An *x*-ray examination made in each case demonstrated vesical calculi in three. Cystoscopy was carried out only where the instrument could be easily introduced without trauma. Diverticuli were demonstrated in two cases by this method.

TYPE OF OPERATION

The two-stage method was performed in twenty-seven cases. The remaining twenty-three were subjected to the one-stage operation. They were of a more vigorous type and considered better operative risks. Protection of the prevesical space by careful packing, aspiration of the bladder before opening, the use of drainage and Dakin fluid for several days prevented infection of that area. The longest period of postoperative drainage was ten weeks, the shortest two weeks, with an average of three and one-half weeks.

COMPLICATIONS

Malignancy was positively diagnosed by microscopical section of removed tissue in 12 per cent of the cases. In three, malignancy was suspected on rectal examination made on admission to the hospital. In these suspected cases, radium was implanted into the lowermost portion of the capsule at the time of operation.

Hemorrhage.—There were no cases of primary hemorrhage, but were controlled by suture, packing, or use of the Hagner bag. One case developed severe secondary hemorrhage on the second day, six hours after the packing had been removed. The wound was reopened and hemorrhage was controlled by insertion of a Hagner bag. A second case developed hemorrhage three and one-half weeks after operation, making it necessary to reopen the suprapubic wound; upon retracting the bladder, a bleeding vessel could be seen at the edge of the prostatic pouch. This was controlled by suture.

Obstruction.—Two cases passed no urine per urethram and the suprapubic wound failed to close. In the first, a cystoscope, introduced into the bladder through the suprapubic sinus, with a sound in the urethra, showed a tag of mucosa grown across the prostatic opening. This was removed and the obstruction was permanently relieved. The same procedure followed in the second case demonstrated a narrowing of the bladder neck. Dilation with sounds relieved the obstruction.

Epididymitis.—Three cases developed epididymitis; except for temporary discomfort, convalescence was not interfered with.

MORTALITY

There were four deaths following operation. One patient, aged sixty-eight, died suddenly four hours after operation from embolus. The second death was due to uremia. The patient, aged 72, was operated on after four weeks of preliminary preparation. His daily output of urine had reached 1,800

c.c. with a specific gravity of 1,009; phthalein test showed a functional capacity of 35 per cent in two hours. The third case, aged seventy, died of pneumonia twenty-seven days after operation. The fourth, aged seventy-six, died of shock three hours after operation. There was very little blood lost during operation and no sign of postoperative hemorrhage.

Forty-six questionnaires were sent to former patients to determine the mortality and morbidity after varying periods of time since operation. Replies were received from thirty-nine. There were seven deaths reported. One patient, aged 73, died of influenza and pneumonia six years after operation. One, aged seventy, died of tuberculosis five years after operation. One, aged seventy-nine, died of heart trouble three years after operation. One, aged 73, died of cancer of the bowel three years after operation. One, aged 62, died of cancer of the stomach two years after operation. One, aged 66, died six months after operation of actinomycosis of the lungs, and one, aged 67, died four months after operation of cerebral hemorrhage.

Three malignant cases were traced. Two died of cancer as above stated. One, at the end of a year, is living and well. He has had no symptoms of recurrence up to the present time. The remaining thirty-two cases report that they are all enjoying good health:

10 years after operation	1
7 years after operation	2
6 years after operation	3
5 years after operation	3
4 years after operation	3
3 years after operation	4
2 years after operation	8
1 year after operation	8

One patient, aged 68, operated on one year ago, whose work requires much heavy lifting, states that he has a slight incontinence on severe muscular exertion; otherwise, he is perfectly well.

All admit that they can pass urine freely and easily; that there has been no obstruction at any time since operation, and that they consider themselves cured.

From a study of the above series, I feel firmly convinced that earlier operations in prostatic obstruction will reduce mortality and shorten both the preoperative and postoperative periods. I can see no reason why operation for prostatic obstruction should be deferred until the patient's kidneys are so damaged by back pressure that he is on the verge of uremia; until his heart is so weakened by myocardial degeneration as to make operation a grave risk; until infection has reached the kidneys, thereby greatly increasing the danger of kidney complications; and until cancer cells infiltrate the surrounding structures and metastasize to bone and other tissues of the body.

The responsibility of the general practitioner lies in the realization of the insidious onset of this disease; that frequency and failing stream may exist for a period of years in the majority of cases and that it is estimated that from 12 to 25 per cent become malignant. He must recognize the importance of a careful investigation of the prostate as a routine in the general examination of all men over forty. By so doing, a larger percentage of these patients will be discovered early enough to give them a safe operation, easier and shorter convalescence, and permanent relief.

DISCUSSION

DR. WARREN A. DENNIS, St. Paul: Doctor LaRose has made a very concise analysis of these fifty cases. I think the conclusions he has reached are those we would all endorse. These patients should be operated upon earlier than they ordinarily are. Doctor LaRose says he can see no reason why operation should be deferred; there is just one reason, and that is the patient will not consent. Most men will not consent to a prostate operation until they have had one or two attacks, with complete retention. That is the principal reason why we cannot get them earlier. What he says about examination is absolutely correct; every man over forty years of age ought to have a rectal examination as part of his routine examination. If this is made and indications are present that prostatic enlargement is going on and some symptoms are present, his mind can be prepared so that when the time comes that this condition is more marked he will be better prepared to submit to operation.

Dr. Hugh Young reported a series of over two hundred cases of perineal prostatectomy without a single death. This is most remarkable. I do not believe that that record is due to the fact that they had been done by the perineal method, but to the fact that these patients were extremely well prepared for operation. Now this is the most important thing in connection with the whole matter. They should be treated with extreme care, as Doctor LaRose has said. When obstructed, the obstruction must be relieved gradually; they must be catheterized with regularity, or even a suprapubic drainage done so that all back pressure is removed from the kidneys. A careful study must be made of the function of the kidneys by any one of the various tests, or, better still, by all; and patients should not be submitted to operation until the conditions are right.

As the result of an experience which we had something like a year ago, in a case of malignancy of the prostate in which radium was used, it occurred to us to see what could be done with radium in cases of benign enlargement of the prostate, and we have treated five of these patients by means of radium. The radium, in the form of needles, is introduced into the prostate through the perineum under local anesthesia, and is practically painless. In these cases which we have treated in this way there is very definite diminution in the amount of prostatic tissue, and it would seem to us from these few that it is entirely possible to reduce the mass of the lateral lobe, certainly to such an extent that they will not interfere with the act of urination. The middle lobe, I think, will be the difficult one to handle, and whether or not it will be possible to reduce that sufficiently so that a man is free from any great amount of residual urine I am not prepared to say. However, we plan to continue trying this out in cases which are difficult to get ready for a radical prostate operation and in those who are unwilling to submit to it.

DR. V. J. LAROSE (closing): The general practitioner often sees cases of prostatic obstruction in the early stages, long before the specialist does. The object of this paper is to impress upon the general practitioner the advantages of earlier operation in these cases.

THE OBLITERATION OF BONE CAVITIES IN CHRONIC OSTEOMYELITIS BY FREE FAT TRANSPLANTATION. A PRELIMINARY REPORT, CLINICAL AND EXPERIMENTAL*

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The obliteration of bone cavities in chronic osteomyelitis presents a rather difficult problem in certain locations. This is particularly true of cavities located in the upper end of the tibia. The proximity of the knee joint and the liability of fracture following the removal of too much cortical substance from the anterior portion of this bone often makes impossible the usual procedure of creating a shallow gutter which the soft parts will fill or which will heal by granulation. In fact, one is unable, in certain cases, to entirely remove the roof of a cavity of this sort without danger of opening the knee joint.

Many substances have been advocated for use in filling defects of this type. Senn states that Lesser made observations in Lister's wards in 1876 with special reference to the organization of blood clots in aseptic wounds and reported his observations in the Deutsche Zeitschrift f. Chirurgie, Vol. III. Neuber, as early as 1879, experimented with blood clots as a method of promoting healing in bone necrosis. Hamilton (Edinburgh Medical Journal, Nov., 1881) advocated the use of the aseptic sponge for soft part defects, but apparently this method was but little used for bone cavities.

Schede, in 1886, described his method of treating bone cavities. He applied an Esmarch's constrictor, removed all dead or diseased bone, disinfected the cavity and sutured, but left a small opening at the top of the cavity which was covered with protective silk, thus obtaining the moist blood crust. Lauenstein, at a meeting of the German Congress of Surgeons in 1888, reported 74 cases treated by this method which proved successful in 64 instances and failed in 10.

In 1889 Senn published his article "On the Healing of Aseptic Bone Cavities by Implantation of Antiseptic Decalcified Bone," reporting several cases in which complete obliteration of the cavity and ultimate cure were obtained.

Many other materials have been advocated such as catgut, cellulose fibre, ivory, perforated rubber, metals of various sorts, plaster of Paris, paraffin, the Mosetig-Moorhof bone wax, Beck's paste, etc. The objections to the use of materials which act as temporary or permanent foreign bodies are obvious.

Flaps of fat or muscle have been extensively used but in many cases where the cavity lies in the head of the tibia this method is not useful or difficult to execute satisfactorily.

Surprisingly little work has been done in the use of free fat transplantation for the obliteration of this type of bone cavity. Caforia, in 1918, reported a successful case, reviewed the international literature and could find record of but 45 cases, of which 16 were successful. Kanavel refers to three unsuccessful cases in which the fat transplants oozed out drop by drop and seemed to do no good.

These cases, with the exception of the one reported by Caforia, were done before the establishment of the Carrel-Dakin technique. Considering the poor resistance fatty tissue offers to infection, the percentage of successful cases seems surprisingly high. One must consider, however, that in this instance we are dealing with a living tissue of an

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individual who has developed a considerable resistance to a long standing infection. The introduction of the Carrel-Dakin technique would seem to modify previous results and necessitate repetition of certain phases of this work, for by this means, combined with thorough surgical treatment, we may render the chronic bone cavity relatively sterile.

McArthur, speaking before the Western Surgical Association in 1913, said: "Turning from the general to the particular, let me instance fat, a tissue made up of a delicate living reticulum stored with an enormously disproportionate amount of fatty globules. For existence and maintenance it requires little more than plasma and asepsis under body conditions; hence, it can be transplanted free, and in almost any bulk, provided these conditions be maintained. For this reason, we may now look to see cavities in bones filled not with Mosetig-Moorhof's plug or Beck's paste, but with pads of living fatty tissue taken from the patient, as was recently demonstrated at Garre's clinic in Bonn."

In October, 1921, a patient entered the University Hospital with a chronic osteomyelitis of the upper third of the left tibia, and, following the suggestion of Dr. A. C. Strachauer and Dr. A. A. Law, it was decided to endeavor to obliterate the cavity with a free transplant of fat in preference to using a foreign substance or attempting a blood clot operation. Other methods did not seem feasible. The history was as follows:

Hospital No. 8813; female; age 49; admitted May 31, 1916. Occupation, housework. Family history, unimportant. Personal history, attacks of cholecystitis for past 15 years. Smallpox 8 years ago. Rheumatism 2 years ago. Present illness, patient entered the hospital 2 days after an attack of cholecystitis with classical symptoms. In addition to this she had sustained a compound fracture of the left tibia in April, 1915. An operation was performed at that time, some pieces of bone removed and the ends of the fractured bones wired together. The wound healed after discharging for 10 weeks but reopened in February, 1916, and has discharged pus since then. The leg was painful, necessitating the use of crutches. Physical examination, essentially negative except for a cholecystitis and osteomyelitis of the head of the left tibia. The cholecystitis flared up three days after admission to the hospital. Urinalysis normal; Wassermann negative. Operation, June 13, 1916, cholecystostomy. Removal of a stone as large as the end of the thumb. Drainage of gall bladder. Cholecystectomy contra-indicated by subacute inflammation. Curettage of left tibia; removal of wire. Cavity in head of tibia carbolized and packed. Uneventful recovery and discharged. Readmission, October 29, 1916. Left leg oedematous and painful. Discharging sinus present and probe encounters pathological bone. Hemoglobin 90 per cent; w.b.c., 6,200. Operation November 11, 1916. Old sinus tract dissected out, cavity curetted to healthy bone on all sides. Cavity measured 1.5x.75x.75 inches. Filled with Mosetig-Moorhof bone wax. Posterior splint applied.

Admission No. 3, September 25, 1917. Wound has discharged since previous admission. Leg is painful. Sinus as large as index finger at upper end of left tibia. Operation, October 5, 1917.

Fig. 1. X-ray taken Oct. 28, 1921 showing bone cavity and osteomyelitis before curretage of cavity (Nov. 3, 1921) preparatory to fat transplantation (Jan. 4, 1922). Notice proximity of cavity to the knee joint.

Proximal end of tibia chiseled out; cavity extended up into the head of tibia which could not be uncovered.

Admission No. 4, October 26, 1921. Physical examination reveals no new findings. Discharging sinus still present. Urine normal; hemoglobin 70 per cent; r.b.c., 4,300,000; w.b.c., 9,860; Wassermann negative. *X*-ray shows old osteomyelitis of upper half of left tibia (Fig. 1). Operation, No-

Fig. 2. X-ray taken Feb. 13, 1922—forty days after fat transplantation.

Fig. 3. X-ray taken nine months after fat transplantation showing considerable new bone formation.

vember 3, 1921. Previous operation incisions extended upward over an inch. As much of roof removed from cavity as seemed possible without opening the knee joint. Cavity extended close to, but does not involve the joint. Cavity thoroughly cleaned out with chisel and curette. Much foul smelling material and necrotic bone removed.

November 12, 1922, Dakin's solution every two hours with reduction of bacterial count to one organism in two fields.

Operation, January 4, 1922. Piece of fat larger than necessary to fill cavity removed from the abdominal wall by an assistant. Cavity thoroughly curetted after filling with iodine. Skin margins excised and undermined. Cavity again treated with idodine. Field draped with clean towels, gowns and gloves changed. Fat inserted, completely filling the cavity of about the size of a hen's egg. Closure with silkworm without drainage. Relaxation incisions placed well laterally on either side.

Fig. 4. Photograph of leg nine months after transplantation of free fat showing central scar of operative closure and lateral relaxation incisions.

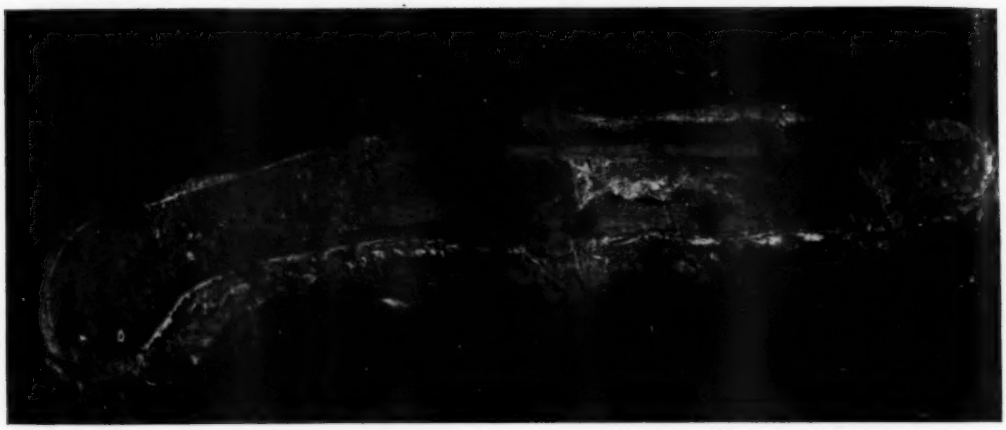

Fig. 5. Fat graft in femur of dog after three and one-half months.

Post-operative, temperature rose to 100 degrees and on the fourth day was normal. Healing per primam. There was no discharge from the wound and no redness or induration was present at any time. There was no evidence of liquefaction of fat or of the presence of fluid in the wound throughout convalescence.

January 20, 1922, skin graft to raw areas where relaxation incisions were made.

On February 13, 1922, *x*-ray, osteomyelitis involving the upper half of left tibia. There is a small central area of bone necrosis (Fig. 2).

A second case of this type was operated at the University Hospital after reducing the bacterial

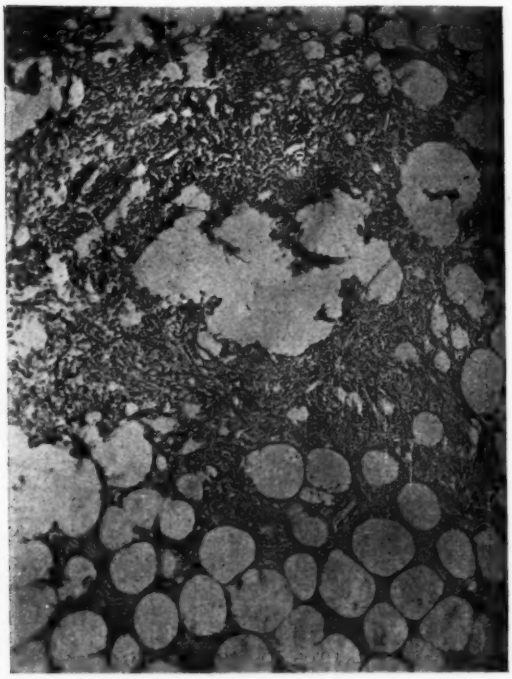

Fig. 6. Photomicrograph of fatty tissue three and one-half months after transplantation into femur of a dog.

Fig. 7. Photomicrograph of another area from graft (Fig. 5).

count to less than one organism to the field. While reflecting the flaps a small isolated pocket of pus was encountered. The technique as before described was followed, but infection developed and graft slowly disappeared. No part, as far as could be determined, remained viable.

Transplantation of fat has been made in eight dogs for the purpose of studying the ultimate fate of the graft. Our results are confusing and the evidence insufficient to lead to any definite opinion. There seems to be some confusion in the literature also. Our observations lead us to believe that in dogs, in certain instances the fat graft remains in situ for a considerable period of time. The specimen exhibited shows such a graft after three and a half months (Figs. 5 and 6). We, however, used fairly large grafts. Caforia finds that the fat graft does not remain in situ as such and that it is totally substituted by new osteoid tissue in rabbits, after twenty-three days, in some instances. Small grafts were used.

The clinical and experimental work which has been done on this subject does not warrant any definite conclusion. Preceded by thorough surgical treatment and relative sterilization with Dakin's solution, the transplantation of fat may be a procedure of practical value in the obliteration of bone cavities in chronic osteomyelitis. In the case reported, the result has been very satisfactory. The wound has now been healed for nine months.

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DISCUSSION

Dr. Bulkley called attention to a paper written by Dr. Walton Martin read before the New York Surgical Society in 1919. Dr. Martin on that occasion presented a series of animal experiments in the closure of bone cavities by transplanted fat and also presented in person three patients into whose osteomyelitic cavities, after thorough Dakinization, he had transplanted fat. In each of these cases the transplant had healed per primam and the fat had not been extruded. Dr. Martin laid particular stress upon the fact that these bone cavities should be practically bacteria free at the time of implantation, a few staphylococci per field only being admissible. All of the cases presented by Dr. Martin still showed on *x*-ray examination a lack of new bone formation in the cavity. This observation tends strongly to confirm the view expressed by Dr. Dunn that in these cases of fat transplantation the fat is not replaced by bone.

Dr. Geo. R. Dunn in closing said that he did not feel that one was entirely justified in drawing a definite conclusion as to the ultimate fate of the transplanted fat. He said it was certain that in some instances at least, the absorption of the fat transplanted in a series of animals was much slower than other observers have reported. In the specimen exhibited there was no appreciable absorption, replacement, or diminution in the size of the fat transplanted, after remaining in the femur of a dog for three months. On the other hand, in the clinical case which he was following, *x*-ray examination showed a considerable amount of new bone formation. From a point of view of treatment it would seem highly desirable that the fat should be replaced by new bone. Whether or not this occurs ultimately he said they were unable to state. Certain it is that the fat maintains its identity for a very considerable period of time.

TREATMENT OF FRESH FRACTURES OF THE SHAFT OF THE FEMUR*

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It is almost impossible in civil practice to standardize the treatment of fractures of the shaft of the femur. In my opinion the Thomas splint comes the nearest to a standard treatment. Unquestionably the straight or flexed and elevated positions which may be obtained by the combined use of the Thomas splint and the Balkan frame are giving the best results in fractures of the upper third. In fractures below the upper third the ambulatory splint which is a modification of the Thomas splint is in my opinion the ideal treatment.

There is at the present time a controversy between surgeons of large fracture experiences as to whether fractures of the shaft of the femur should be treated by operative or non-operative procedures.

*Read in Symposium on Fractures, St. Paul Clinic Week, January, 1923.

In my opinion fractures of the shaft should be treated by non-operative methods whenever possible and that if we perfect ourselves in the use of the different traction methods, the operative treatment will seldom be required.

In simple and comminuted fractures of the femur between the trochanter and condyles in which the skin is intact and there is no interposing soft tissue, it is usually possible to approximate the fractured ends by surface traction. This should be the treatment of choice when it can be accomplished. Nature contracts muscles for the purpose of using them as splints. This contraction may be called pathological contraction or spasm. If sufficient traction is applied, this muscle spasm is overcome, when the bones usually fall into position and remain there so long as sufficient traction is continued. We must use as many pounds of traction as necessary to overcome the muscle spasm no matter whether it be 10 or 50 pounds.

In surface traction the adhesive should be applied well above the point of fracture, as high up on the groin and hip as possible, even if the fracture is in the lower part of the femur. In a fracture the lower end will be carried down by traction, the upper end being fixed. That the soft parts can be stretched and carried down below the proximal end of the fractured bone has been demonstrated in cases of amputation of the thigh in which the bone has been cut too long so the amputated end of the femur is exposed as much as two or three inches. In these cases, surface traction will pull the soft tissues down so they will unite over the end of the protruding amputated femur, demonstrating that surface traction can elongate the soft tissues.

Counter extension can be best secured by the pressure of the ring of a Thomas splint against the spine of the ischium. This pressure against the spine of the ischium can only be attained by raising the ring of the Thomas splint up against the ischium by overhead pulleys and counter weights of about 7 to 10 pounds. If the ring of the Thomas splint is not pulled up against the ischium by counter weights, it will rest on the perineum which can only stand about five pounds of pressure. Besides, this holds the ring up away from the anus so the rectal function is not interfered with and the ring is pulled snugly against the ischium when the patient moves or rises in bed.

Ether should be given when applying traction for reduction so as to secure good initial reduction. In reducing a fracture, overcorrect and rub the ends of the bones together so as to flare out the periosteum and open the blood vessels which will favor early callus formation. If good crepitus is obtained, one will know there is no muscle or soft tissue between the fractured ends.

Care must be exercised in applying the adhesive. Shave, wash the fat off the limb with soap and water, then apply the lateral strips in triplicate. Apply circular bands of adhesive above ankle, below knee, well above knee, and high up on thigh. Pad the malleoli. Apply a gauze bandage over the adhesive and over the gauze bandage apply some adhesive strips to keep the bandage from rolling or loosening.

Surgeons with very large experience, who have used as high as 50 pounds of weight, have never seen any damage done to the knee-joint by properly applied surface traction. The application of adhesive high up on the thigh even when the fracture is in the lower third, relieves the knee of much strain. For slinging the leg in the Thomas splint, cotton flannel is the best. For firmer support, cut aluminum sheets in strips three or four inches wide and long enough to permit moulding to the shape of the leg and bending over the sides of the Thomas splint. These splints will not interfere with the taking of *x*-ray pictures.

The patients with fracture of the femur should be hospitalized so they can be inspected daily to see that proper extension and alignment is maintained. As the femur has a great tendency to bow backward, this must be overcome by preying the femur upward with a stick and pushing more padding under it every day or two when needed. Roentgen-ray pictures should be taken frequently to check the reduction and alignment.

Traction should be maintained for about four weeks in children and from four to six weeks in adults, or until there is no false motion. Then put up in a plaster cast for a month, after which put on a caliper walking splint, which should be worn until union is strong and there is no tenderness in the callus; this will usually be about six months from the time of injury. Many cases of shortening occur because the patient is allowed to bear weight on the leg before the callus is firm.

In fractures of the upper third there is usually marked displacement. The glutei and external rotators draw the upper fragment upward and rotate it outward; the iliopsoas muscle pulls it anteriorly to a position of flexion. The lower fragment is carried inward and upward by the abductors and hamstrings. Because extension acts on the lower fragment and but slightly modifies the direction of the upper fragment, it is necessary to bring the lower mobile fragment into line with the upper fragment. To accomplish this the thigh must be flexed on the body and abducted, which is easily done by shifting the pulleys on the Balkan frame.

Traction has become the important thing in fractures of the femur and may be attained by tying the traction bands over the end of the splint, tightening by twisting the bands, or by weights and pulleys or fixed screw traction. Each method of securing traction demands daily attention.

In order to prevent necrosis of the skin where the ring makes counter pressure against the tuber ischii, the ring should be made to fit snugly. The skin should be pulled back and forth under the ring so the pressure does not always come on the same place. Bathing with alcohol and keeping dry with talcum aids in preventing formation of pressure sores.

When an anesthetic is given, the muscles should be overstretched so as to partly paralyze them, after which not nearly so much traction will be required to maintain the desired length. If an anesthetic is not given, maximum traction should be used at the beginning when the ligaments are firm as there is then less danger of producing relaxed joints than if gradually increasing traction is applied after the ligaments are softened. Maximum traction at the beginning decreases the pain and gives better alignment before the blood clot at the site of fracture becomes organized.

In selecting a Thomas splint, add 1.5 inches to the circumference of the thigh at the crotch. The splint should extend from the tuber ischii to eight inches or more below the heel. For making walking calipers, cut the Thomas splint off and bend the bars in so as to give one-half inch clearance under the heel.

After the application of body casts following fracture-table reduction, the spastic thigh muscles tend to cause a renewal of the displacement no matter how perfect it may have been as shown by *x*-ray at the time of reduction. The position of a shaft fracture, as shown by *x*-ray shortly after reduction and which may seem satisfactory, very frequently shows the original displacement when examined by the Roentgen-ray a few days later. When the fractured ends of a transverse fracture interlock by their serrated edges, a bowing is liable to develop later from muscle-pull within a heavy cast. Oblique and spiral fractures simply tend to slip back into the old displacement. It is practically impossible to maintain any real extension in the longitudinal axis of the leg by means of a plaster-of-Paris body cast. Therefore casts should only be used after the fractured ends have been fastened by some operative procedure. Even then it is best to raise the foot of the bed and attach a counter weight to the cast above the ankle.

It is not maintained that continuous traction results in a perfect anatomic reduction in all cases, but it assures the restoration of the weight-bearing axis of the leg, an insignificant shortening if any, and a result approaching the normal.

In elderly people and in rheumatic patients because of the danger of stiffness, a knee flexion splint should be employed. This consists of the lower half of the Thomas splint attached to the sides of the main splint by a hinged attachment which permits of free extension and flexion at the knee.

The foot should be maintained at right angles to the limb. This position can be obtained by gluing the lower half of the sock to the plantar surface of the foot, or by means of a broad adhesive strip similarly applied. From this suspension a rope is run to everhead pulleys, to which is attached a weight of two to three pounds.

In compound fractures fill the wound with tincture of iodine, official strength. Debride, being sure to cut away all dead and bruised tissues. Fill the wound with iodine again. If the injury has been sustained within forty-eight hours, close with interrupted sutures. If more than forty-eight hours have elapsed from time of injury to time of debridement, drain. Always give tetanus antitoxin. In compound fractures when much skin has been destroyed, and there is drainage, a caliper tong or Steinman nail will have to be used for traction in conjunction with a Thomas splint.

In simple or comminuted fractures, when soft

tissues are interposed between the ends of the fractured bone, and in the very rare cases in which reduction cannot be secured by traction, open operation, with some form of fixation, is indicated. Open operations should be undertaken only by surgeons of experience and the most rigid technic followed. Fixation may be made by one of several methods. Choice of method should be in the following order:

1. Kangaroo tendon,
2. Bovine bone screws and plates,
3. Inlay bone graft,
4. Metal screws extending through skin and dressings,
5. Intermedullary autogenous bone splint,
6. Lane plates,
7. Parham bands,
8. Silver wire.

Always avoid non-absorable fixation materials buried in the wound.

Kangaroo tendon is the ideal fixation material in oblique or spiral fractures, being threaded through drilled holes in the approximated bones. It can be obtained in extra heavy sizes known as X1-2-3-4. It is stronger than silver wire which is apt to break where it is twisted. It is absorbable but not too rapidly so. The knot can be made secure by tying the last half knot of the tendon with chrome catgut.

Bovine bone screws and plates are easily and quickly applied with the aid of the special tools made for their application. They are better tolerated by the bone than metal, in addition to which they are slowly absorbed so the bone is in time relieved of the foreign body. The autogenous inlay bone graft is preferable to any other form of fixation as it stimulates osteogenesis. The objection to its use in fresh fractures is that its accomplishment requires more time and manipulation. The autogenous bone graft is indispensable in old ununited fractures but in fresh fractures the extra operative procedure can and should be dispensed with.

The screw method in which a fracture is screwed together with long screws protruding through the skin through small separate skin incisions, is worthy of consideration. The screws are protected by dressings and can be removed without disturbing the external fixation and extension apparatus after the fractured ends have become agglutinated.

Metal plates, when used, should be removed in children in about six weeks and in adults in about eight weeks, as by that time they will have served their purpose and if left longer they will quite likely cause irritation and late infection.

Any method of fixation should only be used to steady the fragments. External fixation and traction must be depended upon to support the parts until union takes place. No internal fixational agent, however strong, will withstand the constant strain of muscle spasm.

In all cases of bone fixation by any method, the operation should be performed on a fracture table so the extension can be maintained until external fixation and traction has been applied.

It has been my experience that a straight Thomas splint with adhesive traction to the skin and elevation and abduction of the distal end of the splint to secure alignment and approximation in the upper third has been satisfactory. As there is a long interval between the time of union and weight bearing, the muscles and knee can be put in good condition by massage and motion during this interval.

Probably the majority of surgeons are of the opinion that fractures of the shaft of the femur should be placed in a Thomas splint which has the lower portion of another Thomas splint bolted to its sides. This will permit the placing of the limb on a double inclined plane which will give the best neutral muscle position, as well as permit of early flexion and extension of the leg. It is maintained that this early motion at the knee will hurry union, stimulate the circulation, prevent muscular atrophy and stiffness of the knee. This necessitates the use of skeletal traction secured by the use of a caliper tong or a Steinman nail through the condyles of the femur. With the use of the Steinman nail, there is often a reaction with a temperature up to 102 degrees, and a pulse rate up to 100 degrees; in addition osteomyelitis sometimes develops which may require several months to heal. A good caliper tong with adjustable pins which can be locked so they will not penetrate too deeply into the bone or slip and tear into the knee joint should be given preference over the Steinman nail. In applying the caliper tongs, pull the skin up toward the body before incising it so it will be free from tension

after the muscle contraction has been overcome. This will eliminate pain and pressure necrosis in the skin. The pins should be forced about .25 inch into the cortex.

The caliper tongs are especially indicated in fractures of the lower third because the lower fragment is pulled backward by the gastrocnemius. By changing the pulleys carrying the counterweight attached to the tongs, the upper end of the lower fragment can be brought up into accurate opposition with the lower end of the upper fragment. The tongs are not painful and will not cause inflammation if properly and aseptically applied and covered with sterile gauze.

After the limb has been fixed correctly in its elevated balanced position, by weights and counterweights, the patient can move about in bed without changing the position or alignment of the fractured bone.

Added traction can be secured by fastening to the end of the Thomas splint a counterweight and elevating the foot so the body will make counter extensions thereby relieving some of the pressure on the skin over the ischium.

Of equal importance with preservation of proper length is the preservation of the weight-bearing axis of the leg, that is, the avoidance of inversion or eversion of the foot which would destroy the weight-bearing line, from the anterior superior iliac spine through the patellar center to a point between the great and second toes.

In children, because of soiling of dressings and apparatus by urine and feces and because of difficulty of maintaining immobilization, Bryant's vertical extensions or traction is the treatment of choice. Long adhesive strips are applied to the sides of the legs and thighs, fixed by small spiral strips over which a roller bandage is applied. The adhesive strips are brought beyond the feet and joined over a spreader through which vertical traction is made with rope pulley and weight from an overhead support. Counter extension is made by the weight of the child's body. If one leg alone is suspended the child is inclined to twist about at all angles or support himself by raising the body weight with the well leg flexed at the knee, hence both legs should be suspended with enough traction to slightly elevate the buttocks from the bed. After five weeks of suspension, the extremities are lowered. No weight-bearing should be permitted for from three to six months, during which time the child may use a walking caliper splint thereby transferring the weight to the ischium. Extension and fixation by means of a Thomas splint should be the method of second choice in the treatment of fractures of the femur in children.

In obstetrical fractures and in infants, folding the thigh against the abdomen so the foot is in the supra-clavicular space and securing it there by a broad bandage, gives excellent results. The limb should be loosened daily, washed and powdered while being securely held. A soft towel should be placed between the body and leg to prevent chafing. In children up to two inches of shortening will be compensated so both limbs will become equally long.

FRACTURES ABOUT THE HIP JOINT*

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It has been said that the best way to be sure of a satisfactory result in hip fractures is to have a system and a conviction that makes it unnecessary to look up results.

Perhaps each individual has some system that is best for him to follow, and certainly this is true when one reviews the literature of hip fractures and finds leaders in surgery proclaiming some one system as the best, although they vary only slightly in technique and principle.

Fractures about the hip are often difficult to care for, and that many injuries are poorly cared for is demonstrated by the many deformities and non-union of bone seen after injuries in this area.

The causes of these many admittedly poor results may be stated as follows:

1. The true diagnosis has not been made, and if made only meager treatment instituted.

2. The time element is not sufficiently considered.

3. Complications demand frequent change of position in the patient.

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*Read in Symposium on Fractures, St. Paul Clinic Week, January, 1923.

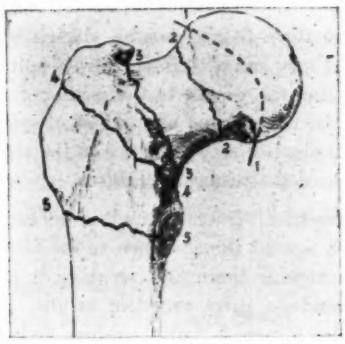

Fig. 1. Fractures about head of femur that may be treated by abduction method. (1) Epiphyseal separation. (2) Intracapsular. (3) Intracapsular. (4) Intertrochanteric. (5) Sub-trochanteric.

4. Poor results obtain even with good treatment because of poor physical condition of the patient.

5. There may be no real treatment instituted.

6. Synovia or tissue may be present between the fragments of bone.

It is not possible in so short a time to more than mention various methods of treatment of fractures about the hip joint, such as the Maxwell-Ruth extension, James E. Moore flexion and abduction method, Thomas or Hodgen splints, operative procedures with bone inserts, pegs, plates, bands, or screws.

I would like to review for you briefly the treatment that I personally use most successfully in fractures about the hip joint, namely the Whitman abduction method. This method of treatment was originally designed by Whitman for the treatment of the so-called intracapsular fracture, but I have found that it can be applied to other fractures about the joint successfully, and because of its value in the treatment of these injuries I feel that the method warrants description and a more universal usage. The principle of the method consists in the use of the anatomical structures about the hip joint; that is, when the hip is completely abducted the trochanter major rests against the ilium, the capsule of the hip joint is tense, the glutei muscles are relaxed and the ilio-psoas are in normal tonus. The hip is fixed when the leg is completely abducted and the fragments fall, in the intracapsular case, into very close apposition. In my experience the last few degrees of abduction usually overcomes the deformity, and in intracapsular fractures complete abduction is absolutely necessary to secure apposition of the fragments. As stated before, Whitman's abduction method can be used successfully in other than intracapsular fractures about the hip joint.

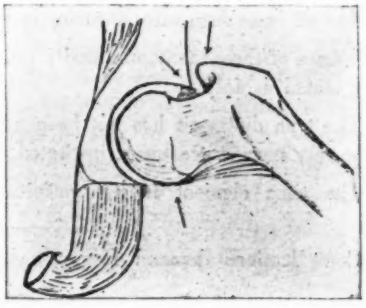

Fig. 2. Principle of abduction, from Whitman. Trochanter major striking ilium, traction on capsule.

Fig. 3. Intracapsular fracture.

In fractures below the trochanter the method can be used if the fracture is not complete or if sufficient periosteum remains to apply the principle of abduction along with traction.*

Injuries about the hip joint demand most careful examination, both physical and radiographic. After diagnosis is complete some method of treatment must be instituted.

The modern orthopedic operating tables of McKenna, Albee and Hawley render the application of the plaster a relatively easy procedure, and indeed a very fair plaster may be applied with untrained

*Biograph: Whitman's Orthopedic Surgery.

help in a farmer's kitchen without any special apparatus except a good plaster bandage and an anesthetic of short duration.

The mode of operation in the abduction method consists of placing the patient on one of the various orthopedic tables or other support so that it is possible to apply a long spica cast and at the same time make strong abduction and traction upon the thigh with the patient relaxed under anesthesia. The normal hip is abducted to its fullest extent, then the injured leg is abducted to the same angle; rotation of the thigh if abnormal is corrected and rotated internally a few degrees. If one supposes that tissue may have fallen between the fragments, effort is made to remove it by flexing and rotating thigh; then again the leg is completely abducted, slight internal rotation maintained, and if necessary, pressure is made under the trochanter lifting it up into a normal plane with the hip on the opposite side. Padding is applied and a plaster of Paris cast from the nipple line to the toes on the side affected; or a short cast extending only to the umbilicus may be used if the opposite thigh is encased in the plaster in abduction. The plaster remains on the patient on an average of two months, depending upon the kind of fracture and the resistance of the patient; then it is removed and a short plaster spica from knee to umbilicus is applied; active, passive motion and massage are begun at this time, but no weight bearing is allowed until three to six months from time of injury, depending upon the type of fracture.

Fig. 4. Abduction applied showing correction of deformity.

The method is most satisfactory in that if complete abduction is maintained, the fractured ends of bones are locked in position. The patient can be moved daily without fear of displacing the fragments. In old people the head of the bed is elevated and the patient is put up on a slanting wheel chair daily. The apparatus is not likely to get out of order, and the average patient wears the plaster without much discomfort.

Fig. 5. Typical intracapsular fracture before abduction method.

Fig. 6. X-ray through plaster Paris spica applied with leg in abduction showing correction of deformity.

FRACTURES OF THE FOREARM*

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It would be impossible to take up here all the various types of fractures of the forearm and consequently it has seemed best to limit this discussion to fractures of the shafts of the ulna and radius, either alone or in combination, and to fractures of the head and neck of the radius. The other common fractures are those of the olecranon and coronoid processes of the upper end of the ulna, and the so-called Colles' fracture of the lower end of the radius in all its varieties, including involvement of the styloid process of the ulna. These fractures are only mentioned to be dismissed as the limited time would not allow even the most important points regarding them to be discussed.

There are certain general principles to be followed in the treatment of all fractures and these apply to forearm lesions as well as elsewhere. It is, of course, an axiom that, all else being equal, the nearer the approach to normal anatomical contour that can be obtained following a fracture the better will be the ultimate result, but striving for perfect apposition of fragments must not crowd from the surgeon's mind the necessity for that even more important factor than anatomical perfection, good function. Only too often does one see results which show that the surgeon thought only of the anatomical side of the question and forgot that the patient had to use the part again. Good function is often present where the anatomical condition is bad and in children it is very surprising at times to see how nature, acting under the law enunciated by Wolff, will change bad deformities into practically normal bones as time goes on. This same law holds good in adults but its workings here are slow, so that the marked results seen in children never appear. I believe it should also be accepted as a definite principle in the treatment of fractures that conservative measures should always be used as a matter of routine and that operative replacement of bony fragments should only be undertaken when all other methods have failed. There are, of course, certain indications for operative interference and, for fractures of the forearm, these will be discussed as they arise.

All fractures treated by conservative means must be held by some external appliance and if the principles underlying their use are understood and the dangers realized, the actual type of apparatus need not of necessity be stereotyped. There can be little doubt that circular plaster of Paris dressings should rarely if ever be used in the primary treatment of forearm fractures on account of the impossibility of properly observing the progress of the case and of the danger of ischemic paralysis. After the acuteness has subsided such a dressing may be used, however, with little or no danger if properly applied. Plaster of Paris splints are very satisfactory and have the advantage of allowing perfect moulding to the parts. The so-called "sugar tong" splint is of this class and gives excellent fixation in addition to allowing daily observation of the parts. This splint is a single long plaster strip which runs from the palm of the hand up to the flexor surface of the forearm, around the back of the elbow and down to the dorsum of the hand. The hand is held in semi-pronation, that is with the thumb pointing upwards, and the elbow at a right angle. Well padded wooden splints are commonly used and can be recommended but it must be remembered that the elbow must also be splinted, usually at a right angle. The best splints are probably the metal gutter splints of Robert Jones in combination with a right-angular elbow splint of the same material. These can be very easily applied and on account of their shape and rigidity prevent undue compression if ordinary care is used in their application. The use of traction by means of glue or adhesive plaster and a weight and pulley, or with a fixed extension by means of a Jones or similar splint, is used at times to overcome overlapping of fragments but this treatment seems to find its usefulness mainly in compound fractures where the wounds have to be dressed frequently without disturbing the fragments. Direct skeletal traction by means of Steinman pins or similar appliance has been used, but certainly the indications for its use must be very rare.

Open operations for the replacement and fixation of fragments can, where indicated, be performed in various ways, but too much stress cannot be laid on the inadvisability of using non-absorbable

*Read in Symposium on Fractures, St. Paul Clinic Week, January, 1923.

material for such work. Frequently kangaroo tendon or heavy chromicized cat-gut, if properly placed through holes drilled in the fragments, will give all the fixation required. Where this does not suffice small intramedullary bone pegs will always hold although rarely an inlay bone graft may be necessary on account of comminution or other complication. Small beef-bone plates have been used with success by the author but one had to be taken out later on account of its becoming loose after the fracture had healed.

The after-treatment with either the conservative or operative treatment is practically the same. The splints must be adjusted as necessary and every case should be examined daily for the first four or five days at least to make sure that the circulation is all right and the fragments staying in position. The greatest danger is ischemic paralysis, that is, the development of muscular fibrosis and its resulting contractions and loss of function due, so far as we know, to the shutting off of the blood supply of the muscles by too tight a bandage or splint or by the interference with the circulation by the swelling, particularly at the bend of the elbow. This condition can develop over-night so its possibility must be thought of when applying the primary dressing.

The time for which the splints must be left on varies slightly with the different fractures, but as a general rule they should be removed at the end of three weeks for massage and other physio-therapeutic measures and only a single palmar splint worn for the next ten days or two weeks, the massage being repeated daily. Of course, active motion of the fingers must be insisted on from the first.

Fractures of the head and neck of the radius are not uncommon but due to their being unrecognized or improperly treated frequently lead to impairment of motion in the elbow joint and in the superior radio-ulnar articulation. These fractures vary greatly in character, ranging from simple cracks through the head to a marked comminution of that part. The button shaped head may be broken into several fragments, one or all of which may become absolutely free in the joint or it may simply be split longitudinally with or without separation of the fragments. The treatment here is of necessity frequently radical for it takes very little deformity of the head of the radius to interfere greatly with proper supination and pronation of the forearm. With the lesser degrees of fracture the simple immobilization of the elbow in the extreme of flexion will usually give a perfect result but where this position does not force the fragments into their normal location further measures must be undertaken. With transverse fracture through the neck, manipulation can sometimes be made to bring the fragments into alignment and fixation in a right angular splint will hold them there, or if further measures seem necessary a pad pressed over the angulation or the proximal end of the distal fragment may suffice. All fractures of the head and neck, however, which cannot be properly reduced and aligned must be operated upon and the fragments and entire head removed. On account of the anatomy of the part it is almost impossible to replace fragments or hold them replaced, so that removal is the only possibility. As is well-known, resection of the head of the radius can be done without apparently interfering with the function of the joints involved. The main precautions to be observed in these operative cases, aside from the usual surgical ones, is to make sure that the neck of the radius is not pulled out of the annular ligament. Following the conservative treatment, gentle motion should be started in from two to three weeks with massage daily to restore function more quickly to the parts. By the end of four weeks or even sooner if the fragments were impacted, no further protection is necessary. If there is no separation or displacement of fragments, rest until the acuteness following the injury subsides is all that is necessary.

The shaft of the ulna is not infrequently found fractured alone, usually from direct violence such as is incurred by warding off a blow, and presents then in most cases the simplest type of fracture we have to deal with in the forearm. The ulna is subcutaneous for its entire length and if the radius is intact the reposition of ulnar fragments is not difficult as they can be directly palpated. Sometimes it is necessary in cases with a short lower fragment to pull the wrist into the extreme of radial flexion in order to accomplish this reduction. The great complication of apparently simple ulnar fractures is dislocation of the head of the radius and one must be careful not to overlook this condition and give a good prognosis to the patient. Most of these complicated cases will need operative treatment d-

rected at reducing the dislocation and holding it reduced or, this being impossible, the head of the radius must be excised. Open operation for the reduction of ulnar fragments when the shaft has been alone fractured is probably never necessary.

Having reduced the fracture, simple antero-posterior splints of the types already mentioned, with the hand in the semi-pronated position, will suffice for retention. It is not always necessary to run these splints above the elbow if the fracture is low down, but the wrist joint should always be immobilized, the fingers being allowed free action, however. Circular plaster of Paris dressings can be used by one with experience but are to be condemned as a routine procedure for the reasons given above. By the end of two and one-half to three weeks the dorsal splint can be removed and the palmar one strapped on alone for another week. After this time no further support should be necessary but physio-therapeutic measures should be used daily when possible.

Fractures of the shaft of the radius alone, although not seen as often as solitary ulnar fractures, are still far from uncommon. In spite of being well splinted by the unbroken ulna the fragments are not always so easy to reduce as are ulnar fragments for, in addition to being buried in muscle through practically their entire length the pull of the biceps and of the pronator quadratus muscles causes resistant deformities of the fragments. If the fracture is above the attachment of the pronator teres muscle the upper fragment tends to become flexed and supinated due to the pull of the biceps and this can only be met, in the conservative treatment, by fully supinating the forearm and placing the elbow at a right angle, and in that way rotating the lower fragment to meet the proximal one. Any of the splints described will hold the fragments. With a fracture of the radius just above the pronator quadratus the lower fragment is pulled toward the ulna while the upper fragment is rotated externally and pulled away from the ulna. Full supination is again necessary to get the fragments into proper alignment and in addition ulnar flexion of the wrist may be necessary in order to pull the upper end of the lower radial fragment away from the ulna. The retentive dressing is the same as for fractures higher up as just described. These fractures of the radius alone rarely show much overlapping due to the splinting of the intact ulna, but nevertheless it is sometimes only by open operation that reduction can be accomplished. The usual splinting should be maintained and the splints removed early for massage of the part but rotation in pronation and supination must be guarded against longer and five weeks is a safe time to set before allowing this motion.

Fractures of both bones of the forearm present a much more difficult problem than where only one bone is broken for here we lose the splinting action of an unbroken bone and marked overriding and angulation of fragments can easily take place. The simplest type in this class is the transverse fracture of both bones without displacement and with little or no angulation. Here, of course, simple fixation as above outlined is all that is necessary, the elbow being at a right angle and the forearm in semi-pronation. The other types of double fracture need more elaborate preliminary treatment. The attempt at reduction should be made with the forearm flexed to a right angle and with an assistant making counter-traction by holding the arm at and above the elbow. The surgeon then makes traction on the forearm with one hand and manipulates the fragments with the other, bringing the part into supination during this maneuver. This procedure brings the fragments into better alignment and allows more satisfactory handling of them. End to end reposition must be obtained but by that is not meant perfect apposition. The fragments can be in contact for as little as one-third of their diameter and still a perfect functional result can be obtained. The great danger is cross union or interference with some portion of the rotary motion of the radius by the too close approximation of fragments of the two bones to each other. The semi-pronated position, in addition to holding the radius and ulna further from each other than the position of extreme supination, is the most comfortable for the patient and is the position of choice unless contra-indicated as previously mentioned. Where it is impossible to obtain a manipulative reduction, and one should not give up after the first attempt, open operation is indicated and is recommended as better than the attempts at slower reduction by means of the weight and pulley or fixed traction. If the fragments after reduction can be held with absorbable sutures they should be used and the more complicated and time consuming methods used only when the simpler methods

are insufficient. Not uncommonly it will be found that only one bone will need the operative fixation, the other remaining in place with only the external splints to hold it. Any of the methods described may be used for the fixation of the fractures whether reduced by the open or closed methods and the usual observing after-treatment is the same for both. From the third week on careful massage should be performed daily, but not until the end of the fifth week should the arm go unsplinted. There is always danger of late bowing or angulation developing if the forearm is used before the callus has had time to harden.

In conclusion, the points to be remembered are:

1—Conservative treatment must always be used if possible in the treatment of forearm fractures.

2—Circular plaster of Paris dressings should never be used as a routine procedure in such fractures.

3—The use of splints of the coaptation type with a right angular splint for the elbow is the conservative treatment of choice.

4—Operative treatment must use the simplest fixative method possible to obtain results, the use of metal plates or wire being absolutely contra-indicated.

5—Early massage and physiotherapy will hasten recovery of function and accelerate bony union.

MANAGEMENT OF HEART DISEASE IN CHILDREN*

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Although the mortality rate in general in the United States is on a decrease, the mortality rate from heart disease is on an increase. In a census, taken in 1919 by the Metropolitan Life Insurance Co., it was shown that organic heart disease caused the highest number of deaths—about 155,000—in the United States.

From 1910 to 1917 the death rate from heart disease increased from 9 to 35 per 100,000. Studies conducted by the Metropolitan and New York Life Insurance Companies revealed the fact that heart disease reduces longevity by one-half, and that 60 to 70 per cent of all cases of mitral regurgitation suffer their primary attack during childhood. Two to two and one-half millions of people suffer from continuous disability on account of this disease.

The seriousness of cardiac disease amongst children is underestimated. One to one and one-half per cent of all school children are handicapped by permanently damaged hearts, according to an investigation of the schools of New York City. A similar investigation would, in all probability, reveal about 700 heart cases amongst the Minneapolis children of school age. Amongst the 20 million school children of this country between five and thirteen years of age, there must be about 200,000 who should be treated for heart disease. The signs and symptoms, the clinical progress, the prognosis and the treatment of valvular disease in children are so different from those in the adult, that it is impossible for the student to have an intelligent understanding of the subject in the child, from a study of the same disease in the adult. In the adult, the student finds usually the signs of cardiac failure; in the child failures are rare before the age of fourteen. In the adult the physical signs are complicated, involving many organs; in the child the signs are few if any, and are usually referable to the heart alone. In the adult the prognosis is poor, while in the child the prognosis is usually good. The normal heart of the child presents many anatomical and physiological peculiarities. The heart lies higher than in the adult; the apex beat is outside of the nipple line immediately after birth, assuming the adult relationship at about seven years. During the first year the heart hypertrophies normally to three times its original weight and volume. The heart sounds differ from those of the adult in intensity as well as in relation to each other, which fact is of clinical importance in certain heart affections. At birth and for about a week after, they are tic-tac and galloping in character, with no difference in tone between the first and second sounds. At about the end of the second year the first sound becomes booming and louder than the second sound, this relationship persisting throughout childhood. The sounds are louder in the standing posture than in the lying. Impurities, roughness and splitting of the sounds, especially of the first, may occur in perfectly healthy children.

*Read before the Minnesota State Medical Association, Minneapolis, October, 1922.

Whereas alcoholism, syphilis and other degenerative processes are etiologic factors of heart disease in the adult, rheumatism, tonsillitis and chorea cause 90 per cent of acquired heart disease in the child.

The reserve of the heart is relatively greater in childhood than in later life due to the absence of a vicious circle of accumulated abuses. For this reason the prognosis in pneumonia, for example, is more favorable in the child than in the adult. Because of the imperfect inhibitory mechanism controlling the heart, non-pathologic arrythmias are of more frequent occurrence in childhood than in later life. About 90 per cent of all heart afflictions in children involve the mitral valve, aortic and tricuspid lesions being practically always secondary to the mitral lesion.

Heart disease is first suspected when a murmur is heard. A heart murmur is heard quite commonly at birth and for a few weeks following. It is practically always associated with a patent foramen ovale or a small patent interventricular septum.

These murmurs usually disappear within the first few months. The majority of murmurs heard during the period of infancy are congenital in nature. They are usually quite loud, musical or harsh. They may be heard all over the chest and back and even over the abdomen with the maximum intensity usually to the left of the sternum over the second and third intercostal spaces.

Acquired murmurs due to organic heart disease occur rarely in infancy. They are, as in the adult, produced by inflammation of the endocardium, usually as the result of acute infections, especially tonsillitis and rheumatism. They are often best heard at the apex and transmitted most frequently towards the axilla and the back. They are sometimes musical, rarely harsh in tone, and not as loud as those of the congenital type. In acquired heart disease the systolic murmur is by far the most common. The diastolic murmur, however rare in children, is always pathological and is usually a part of a double murmur.

In children of school age non-pathological murmurs are quite frequent and too often diagnosed chronic endocarditis. No matter how loud they are they are never associated with a diminished exercise tolerance. Non-pathological murmurs may be classified as follows:

1. The cardio-pulmonary murmurs are systolic murmurs, heard best at the left of the sternum, at about the second and third interspaces. They frequently disappear or diminish in intensity upon holding the breath.

2. The atonic murmur is usually heard at the height of an acute infection, disappearing upon recovery. This murmur is systolic, may be heard best at the apex, and is often transmitted into the axilla.

3. Compression murmurs depend upon the pressure of the stethoscope upon the chest. They are frequently heard in rickets.

4. So-called accidental murmurs because of the absence of any signs of heart disease (the *x*-ray and electrocardiogram being normal) are systolic in time, soft, superficial, usually losing their intensity before the end of the first sound. They can most frequently be heard at the pulmonic area. They are well localized, transmission into the axilla being rare. The belief that these murmurs are heard best in the lying posture and disappear in the erect cannot be confirmed by the author.

The venous murmur or venous hum occurs very frequently in normal children especially during the school age. It can be heard throughout the entire heart cycle, over the internal jugulars, sometimes loud and harsh, at other times low and soft. It is loudest at the inner third of the clavicle. The murmur almost always diminishes in the prone position and is usually accentuated by even moderate pressure with the stethoscope.

Arterial murmurs are always pathological in children. They are heard best at the angle of the jaw or over the inner edge of the sternocleidomastoid muscle. Arterial murmurs over the vessels of the neck are common in congenital heart disease. A systolic murmur is also frequently heard over open fontanelles, especially in rickets during the first year of life.

In the absence of enlargement of the heart and other signs of organic heart disease, congenital or acquired, a murmur should not be given serious consideration.

The determination of myocardial efficiency is especially important for prognosis and treatment. A careful and detailed history of the subjective signs following exercise is necessary. (A mother's observation of how the child reacts to the usual

activities is, as a rule, quite reliable.) Is the child able to indulge in the simple and necessary exertions without any untoward effects? Does climbing stairs or playing games cause uncomfortable dyspnea? In addition to the history the so-called functional cardiac tests may be of aid. However, not any one of these tests alone determines the cardiac reserve of an individual, because the effect of the central nervous system on the circulatory reactions cannot be measured. These tests are based upon the effect of posture and exercise on the pulse rate and systolic blood pressure. In a paper recently published in the American Journal of Diseases of Children, the author found that in normal children the pulse rate was invariably higher on standing than on lying, the ratio of the two pulse rates being 1.15. (Pulse rate $\frac{\text{standing}}{\text{lying}} = 1.15$.) The average difference between the pulse rate in the standing and lying posture equaled 12. The author also found that the blood pressure in the lying position was invariably higher than that in the standing, the average ratio of $\frac{\text{blood pressure standing}}{\text{blood pressure lying}}$ equaled 1.11. In short the ratio $\frac{\text{blood pressure standing}}{\text{blood pressure lying}}$ about equals the ratio $\frac{\text{pulse standing.}}{\text{pulse lying}}$

In short periods of exercise with dumbbells, the blood pressure rose on an average of 15 mm. in smaller children (after 40 swings) and 32 mm. in older children (after 90 swings) returning to normal within three to four minutes. The pulse rate increased on an average of 42 beats and returned to normal within two minutes.

The increase of the pulse after short intervals of exercise on the ergometer, a stationary bicycle, was about 62 beats whether the subject rode 1, 2, 3 or 4 minutes. The reaction time increased with an increase in work, averaging 3 minutes after 1 minute and 6 to 7 minutes after 4 minutes. The blood pressure is in proportion to the amount of work performed, the return to normal varying from 4 to 6 minutes.

Exhaustive exercise on the ergometer caused an increase in the pulse rate from 48 to 116 beats. The pulse rate did not return to normal within ten minutes after cessation of exercise. The average rise of the blood pressure amounted to 30 mm. for children from six to nine years, and 35 to 41 mm. for the older children. The average reaction time of the blood pressure, obtained on statistical calculation, gave an average of 310 seconds with a probable error of ± 15 and a coefficient of variability of 7.

THE MANAGEMENT OF HEART DISEASE

The following classification based upon the functional diagnosis of the heart is in use at the Lymanhurst Clinic for Heart Diseases of Children*: (1) potential heart disease; (2) heart disease of the first degree; (3) heart disease of the second degree; (4) heart disease of the third degree and (5) effort syndrome.

1. *Potential Heart Disease.*—Since rheumatism and its allied diseases, recurrent tonsillitis and chorea, cause 90 per cent of all heart disease in childhood, our hope of decreasing the high incidence and mortality of this disease lies in a preventive campaign against rheumatism. Recurrent attacks of tonsillitis, with or without an increase in temperature, are signs of potential heart disease. So-called "growing pains," in reality rheumatic manifestations, stiffness of the neck and obscure pains in various parts of the body are also suspicious signs. In the absence of symptoms of organic heart disease, all foci of infection should be immediately eradicated and the patient examined every three months to watch the course of the disease.

2. *Heart Disease of First Degree.*—In this group belong children with a mild organic heart lesion, their exercise tolerance, however, being normal. They frequently exhibit rheumatic signs with typical, loud systolic murmurs at the apex transmitted into the axilla. The heart is only rarely enlarged. Early and proper treatment renders the prognosis very good. All foci of infection should be removed as soon as possible, so that the child may resume its school work. Reexamination every three months is important.

3. *Heart Disease of Second Degree.*—In this group of children, in addition to the symptoms mentioned in Group 2, signs of decompensation appear as fatigue on exertion, dyspnea in varying degree and palpitation. These children should be

*The Lymanhurst Clinic for Heart Diseases of Children is conducted by the Minneapolis School Board. It is located on 18th St. and Chicago Ave., Minneapolis.

given a very careful examination not only for the diagnosis of the anatomical lesion but especially should their myocardial efficiency be determined. The patient should remain under observation in the hospital for 48 hours. The temperature by rectum, the pulse and the respiration should be recorded every four hours. The effect of posture and exercise on the blood pressure and pulse should be determined. In the presence of an active infection the foci of infection should be removed, even though definite signs of decompensation should be found. By properly graduating the exercise tolerance of these children, they may be advanced into the group of heart disease of first degree. The prognosis of heart disease of second degree is much more favorable in the child than in the adult.

4. *Heart Disease of Third Degree.*—Children with signs of severe decompensation belong to this group. Their treatment is similar to that of the adult. They must be put to bed at absolute rest, preferably in the hospital. The prognosis in this group is poor. Foci of infection should be eradicated as soon as is thought advisable.

5. *Effort Syndrome.*—A large number of children complain of fatigue upon slightest exertion. Examination reveals no heart murmurs nor enlargement of the heart. Their exercise tolerance, however, is low. These children are analogues of the soldier with effort syndrome. Some are congenital asthenics, some have drop hearts, or long narrow hearts. They almost all have a poorly developed muscular system. They should be treated as cases of heart disease.

Special Points of Treatment.—There are two fundamental principles underlying the treatment of heart disease in children: (1) the early diagnosis of all diseases that are potentially forerunners of heart disease, and (2) the conservation of the heart muscle after an organic involvement of the valves has already developed.

Preventive Measures.—The prevention of acquired heart disease in children depends almost entirely upon the eradication of such foci as diseased tonsils, recurrent multiple abscesses, sinusitis, chronic otitis media and chronic pyelitis. In all potential heart cases a most thorough search should be made for some forms of infection.

St. Laurence* has shown in an investigation of 65 potential cases suffering from so-called rheumatic signs or chorea, or both, that 75 per cent of all the children treated over a period averaging 4.5 years did not develop cardiac lesions.

Rest.—In children we usually err in advising prolonged rest. Only children showing fatigue upon the slightest exertion, dyspnea and other signs of decompensation should be taken out of school and put to bed. The patient should rest in bed in the position most comfortable for him. He should be kept in bed until fever and tachychardia disappear. In school children, a pulse of 100 beats per minute or over in the lying posture may be considered tachycardia.

Exercise and Games.—As soon as a child is allowed to walk, effort should be made to increase the tone of the myocardium through regulated supervised exercise. The ideal exercises are the playing of games in fresh air and the simple arm and foot calisthenics mentioned in detail below.

1. Hands on shoulders. Right arm upward—left arm downward. Hands on shoulders. Left arm upward—right arm downward. (Repeated in rhythm, one count for each movement.)

2. Touch step forward right, arms forward. Touch step sideward right, arms sideward. Touch step backward right, arms upward. (Repeat in rhythm, repeat to left. One count for each movement.)

3. Hands on hips. Knees deep bend. Knees stretch. (Repeat.)

4. Hands on hips and right foot forward. Trunk to right. Trunk forward. Feet change. Trunk to left. Trunk forward. (Repeat.)

5. Arms sideward. Trunk to right—bend. (Repeat to left.) Trunk raise.

6. Arms sideward raise, feet apart, right hand touching floor between feet, left hand upward, trunk forward. Arms sideward, trunk—raise. (Repeat.)

7. Arms sideward and heels raise. Heels sink. (Repeat.)

8. Arms upward—bend. Arms sideward—fling.

The above exercises should be given two to three times a week for 15 to 30 minute periods. Athletic games and gymnasium work as carried on in the schools are harmful to a child with heart disease.

Mental and Physcal Hygiene.—It is a mistake

*St. Laurence, William: Jour. Am. Med. Assn., April 1, 1922.

psychologically to tell a child that it is suffering from heart disease. Children should be advised concerning the signs of decompensation in simple language so as to avoid overstrain. Hygienic measures such as rational diet and sufficient sleep are of course important in promoting the child's general health. Since the treatment stretches over a long period of time the child as well as the parent should be admonished to have patience.

Tonsils and Adenoids.—The most important source of infection is the tonsils. In all rheumatic conditions, as well as in heart disease except in the acute stages of endocarditis and articular rheumatism, the tonsils should be removed. Should the symptoms persist after the removal of the tonsils, incomplete tonsillectomy may be the reason. In chorea tonsillectomy often causes a complete disappearance of symptoms or at least a marked improvement. In decompensated cases with increased temperature and tachycardia, the removal of the tonsils is the lesser of the two evils, even though the surgical risk may be great; for by operation there is a hope of changing a fourth degree into a third degree, whereas, a permanent source of reinfection renders the prognosis hopeless. The pediatrist should decide whether an operation should be carried out or not and advise as to the kind of anesthetic. Ether preceded by nitrous oxide is the best anesthetic. The same consideration applies to the adenoids, if present.

Drugs.—Text-books of pediatrics recommend many drugs in the treatment of heart disease which are of no clinical value. Among these are strophanthus, camphor and strychnine. Bromides are of great value indirectly. Children of second and third degree, especially, who are restless, should be given large doses of bromides upon admission to the hospital. Sodium bromide in 10-grain doses two or three times a day to children of school age (given until slight drowsiness results) is of great help. This should be given only for a few days at a time. Morphine is also of value in congenital heart lesions of the stenotic types, especially when accompanied by convulsive attacks and angina. Morphine is also indicated in myocarditis due to diphtheria, especially in the presence of dilatation.

Digitalis should not be administered in heart disease as a tonic. It should be used only in the last stages of the third or fourth degree in attacks of decompensation, especially in auricular fibrillation. It should be given in large doses (according to Eggleston) for a period of twenty-four hours. In a child six years old and weighing 50 pounds, 5 c.c. of the tincture should be given during one day. The first dose (2 c.c.) may be given at midnight and three doses of 1 c.c. at six-hours intervals. If benefit is not seen in 24 hours it should be discontinued.

In view of the alarming increase in the incidence and mortality of heart disease in the United States, a great program of education of parents, social workers, nurses and even of children should be begun. Children should be examined regularly for heart murmurs in public schools. All potential cases of heart disease should be treated early. Our population should be taught, by pamphlet literature and through the press, the early signs of heart disease. Rheumatism, chorea and their effects upon the heart should be explained not only to parents but to children in simple though accurate language.

What has been done against tuberculosis, with splendid results, should and can be done for the control of heart disease.

STANDARDIZATION OF CLINICAL LABORATORIES AND TECHNICIANS*

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With the increasing importance of the rôle the pathologist plays in clinical medicine and the growing appreciation of his laboratory by clinicians, a place of the laboratory assistant commonly known as technician has become fairly well established as a vocation particularly adapted to intelligent young women of proper eductional preparation and technical training. Demand for such young women is steadily and rapidly growing among the medical profession who recognize the part the laboratory technician plays not only in the diagnosis and treatment of disease but also purely as a business proposition.

The average physician, however, is not only unappreciative of the merited place she has thus attained in the medical world but also is surprisingly indifferent toward her proper development as a professional of high standing. This evident lack of interest on the part of the medical man is mainly responsible for the various misconceptions enter-

*Presented before the annual meeting of the Minnesota Medical Association, Minneapolis, October, 1922.

tained by prospective technicians concerning the nature, possibilities and limitations of this vocation and its training. Little consideration is given to such fundamental conditions of proper training as educational qualifications of the candidate, character and scope of instruction, period of training, etc.

As an inevitable result, a large number of medical laboratories throughout this country are manned by insufficiently trained technicians whose presence alone makes such laboratories institutions of questionable value. The matter is further complicated by the unwelcome intrusion into this field of commercialized laboratories established too often by male technicians of questionable preliminary education and technical training. The seriousness of this complication is not fully comprehended by the average physician, although a casual inquiry will doubtless convince him of the utter lack of standard and of proper supervision in many of these laboratories and of the consequent danger alike to the patient and the physician.

Important as the problem is in the advance of clinical medicine, its consideration has not been widely given by medical men up to the present time, and, as a consequence, references in current medical journals upon this topic are quite limited.

Concerning the training of laboratory technicians, Gradwahl[1] advocates the establishment of schools under proper direction and further suggests the registration of technicians by a board. He considers six months to be sufficient for such training while Grant and Wilson[2] fix a minimum period of two years. The medical school of Minnesota[3] has just inaugurated a course of four years leading to a bachelor's degree.

Concerning the standardization of clinical laboratories, Moore[4] urges the employment of methods similar to those adopted by the American Medical Association in the standardization of medical colleges, or of hospitals by the American College of Surgeons.

Kolmer[5] advocates licensure of non-medical directors of laboratories who may then be qualified to interpret findings. The majority of pathologists appear to disapprove of this plan.

The present-day technician may be one of the following three general groups: (1) one who acquires limited training as a helper in a laboratory and who nevertheless ventures out as a qualified technician in search of a more lucrative position; (2) one who receives a certain prescribed course of training of three or four weeks to six or eight months' duration in a laboratory and is thus known as a qualified technician; (3) one with a college degree who majors in chemistry or bacteriology and sometimes attends in addition classes in clinical pathology and allied medical subjects and is acting as a technician.

These technicians of varied educational qualifications and technical training may be definitely classified according to the scope of their experience and ability. A routine technician is one who is master in general routine methods only, while an advanced technician is one who is qualified to perform more advanced and complicated laboratory procedures such as the Wassermann test, blood chemistry, basal metabolic rate, determinations, advanced bacteriologic and pathologic methods, etc., in addition to routine technic. A specialized technician is one whose practice is limited to one or two branches of the advanced laboratory science.

The minimum educational requirement of a technician is generally set at high school graduation. While college education is desirable in an advanced technician, it is not essential in a routine worker. A nurse who possesses a certain amount of fundamental education and experience in medicine makes an excellent routine technician and occasionally a well balanced advanced technician when properly trained and supervised; while a college woman of proper experience possesses certain educational advantages which qualify her at once to occupy more advanced and specialized positions among laboratory workers.

Concerning sex preferences, such essential qualities as refinement of technic, mastery of detail, perseverance, conscientiousness, thoroughness are natural possessions of women and make them more logically adapted in this field than their more aggressive brothers who are naturally endowed with such fundamental virtues as independence of thought, aptitude for responsibility, positiveness, originality, initiative and business sense, which, when not properly directed, are apt to prove a menace to a commercialized laboratory whose chief aim is financial success. Successful male technicians will, with few exceptions, sooner or later attempt this commercial venture.

In spite of the rapidly increasing demand for good reliable technicians, properly organized schools for systematic training of such technicians

are not found among educational institutions of this country.

Of the nine institutions named by the American Medical Association,[6] only one school is found to be actually offering such a course of training to prospective candidates. And this is a commercial laboratory in St. Louis. St. Paul also claims a technician's school operated as a part of laboratory business. A college course for medical technologists is now being offered by the University of Minnesota, one by far the most complete and the most scientifically conducted of any school known up to the present time according to the bulletin.

A distinction must here be made between the advanced or specialized technician and the routine technician. The former is produced by such a scientific and systematic course as the University of Minnesota has just inaugurated or by several years of actual experience in larger scientific medical laboratories; while the latter may be trained in a comparatively short period of time by intensive practice and study such as outlined below. The writer is particularly interested in this latter class of technicians, who constitute at least 80 per cent of laboratory workers of today.

In a practical course of training of not over one year which aims to produce routine technicians and which probably appeals to the majority of young women, much of the didactic teaching is omitted and abundant opportunity for intensive practice is given. The two fundamental conditions in such a practical course are: First, a proper method of teaching and demonstration; and, second, an adequate source of teaching and practice material. The only analogous student life is found in the training school for nurses in which fully 80 per cent of their education is acquired through bedside practice.

A lecture room atmosphere should be replaced as far as possible by frequent group or individual conferences in which methods are demonstrated, and findings discussed in a simple and interesting manner. This should be supplemented by routine lectures and occasional quizzing.

The common conception is that a period of four weeks to three months is all-sufficient to fully equip a technician even including training in the technic of the Wassermann and blood chemistry. Even the schools referred to above offer a complete course in six months. Gradwahl[7] prescribes one month each for blood chemistry, Wassermann and applied bacteriology and two months for the complete routine laboratory technic. His preliminary requirement is high school graduation or its equivalent.

Another institution offers in addition one or two lectures in each of various medical subjects and even in methods of bookkeeping, stenography and roentgenology, etc., to students ostensibly of high school education, all in a course of six months. The objection to such a course conducted by a commercial laboratory is two-fold: first, inadequacy of teaching material, both in number and variety available for repeated practice and mastery of technic; and, second, unavoidable high cost of training due probably to the taint of commercialism.

There, the primary importance is attached to a series of lectures delivered and copied. The laboratory period is merely devoted to the demonstration of methods and to the very limited amount of practice, not as elaborate but similar in extent to the course of clinical pathology in medicine from which no one has ever come out as an expert in technic. Opportunity for intensive training amidst many and varied specimens such as is afforded by a large clinical laboratory, where several hundreds of specimens of various descriptions are daily examined, is entirely lacking.

As a consequence the student merely receives working knowledge and not the mastery of technic while in training. Mastery in technic can only be obtained by devoting at least one full month of intensive practice to each of the various methods with a daily average of at least from twenty to thirty specimens. As for the Wassermann and other advanced laboratory technic, no prescribed period of training is advisable, several months of apprenticeship generally being necessary before the technic is mastered.

In a general way, these advanced methods and some of the routine examinations may be reliably performed by these technicians after sufficient training. It is, however, a dangerous practice to let them bear the entire responsibility unless they possess a thorough knowledge of fundamental sciences as well as technical skill.

The standardization of technicians may be accomplished by the adoption of the standard methods of training various classes of technicians with a fixed minimum required of a routine technician and by the comparative tabulation of the amount and character of their individual training and subsequent experience.

With the proper standardization and classification of technicians the standardization of clinical laboratories becomes a comparatively easy task, for the technical part of these laboratories is more and more being delegated to skilled technicians often without the close supervision of the pathologist.

The proper qualification and ability of the technician in charge then may be considered the first essential of standardization. Of second imoprtance is the qualification of the medical man in charge, be he a pathologist, an internist or a general practitioner.

In the final analysis, the proper training and classification of technicians and proper equipment and standardization of clinical laboratories can never be consistently accomplished until the entire medical profession through the State Association or the State Board of Health or the State Board of Medical Examiners shall adopt a policy delegating these matters to a central control body whose duty may be briefly outlined as follows:

1. Registration and classification of technicians.
2. Standardization and classification of medical laboratories.
3. Standardization of terminology and report.
4. Censors of commercial laboratories.
5. Standardization of schools for technicians.
6. Standardization of methods of teaching future technicians.

The formation of clinical laboratories throughout the state into an association on the one hand and organization of registered technicians into a society on the other perhaps as a subsidiary to the Pathological Society or the State Medical Association may also be urged.

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DISCUSSION

DR. R. O. BEARD, Minneapolis: I agree for the most part with what Dr. Ikeda has said. Perhaps the best contribution I can make to the discussion is to report the demonstration made by the Medical School of the University. For the third time the topic of standardizing courses for technicians was presented to the Administrative Board last fall. They then authorized a survey to determine three things: First, the need of trained technicians; second, the demand of students for education in this field; third, the outline of courses which might be offered.

The inquiry on the first point proved very conclusively, as we had anticipated, that the demand for trained technicians was great and that it came from hospitals, institutions, group clinics, and physicians' private offices. Generally we met with the statement that these people were tired of untrained technicians whose limitations constantly put a handicap upon their success.

In the matter of students who might desire to undertake this work, we had a substantial surprise. A careful survey showed that thirty-seven students were on their way through a four year course for the B. A. degree whose objective was that of the technician. Study of their work showed that they had been largely misdirected and that much of it failed to contribute to their end result. The need for supervision was very clearly evident. We then outlined courses which were approved by the Board and have been in operation during the last year. We have now over fifty women in the University undertaking this work. All are headed for a four year course. In those cases in which work had already been undertaken, we are trying to make the rest of their course as effective as possible. The Bulletin offering these courses in technology proposes them not alone for clinical but for laboratory service as well. It is to be recognized that there are two groups—those desiring employment in laboratories for general clinical service and a smaller group desiring employment in teaching laboratories. We find women ready to undertake both fields, although by far the larger number select the clinical. They all take two years in the college of arts, in general chemistry, qualitative and quantitative analysis and organic chemistry, in biology, rhetoric, English, French or German, and physics. We have had no difficulty at all in securing the acceptance of these courses by these young women. Then follow two years of registration in the medical school. Four sequences are offered—a sequence leading to technical service in clinical laboratories; a sequence leading to technical service in anatomy and neurology; a sequence leading to bacteriology and immunity; and a fourth to pathology, neuro-pathology and gyne-pathology. We have students in each and all of these, but the major number are undertaking the sequence for clinical work. I shall be glad to send copies of the bulletin to any of you who may be interested in the matter.

I wish to say in support of Dr. Ikeda's argument and in recognition of the need of practical training that these courses provide for one or more quarters of clinical laboratory study. The courses are so arranged that the technical studies may be covered in the rest of the time. We are enjoying the co-operation of several hospital laboratories in the acceptance of these young women for training in practical laboratory service.

EMYPEMA*

An Analysis of 100 Cases in Relation to Treatment†

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The interest in empyema was acutely stimulated by the influenza epidemic of 1918-19 and the chest injuries of the World War. A very great deal has been written on the subject and innumerable methods of treatment have been described. The fundamental principles upon which any treatment for empyema should be based remain the same. In the analysis of these 100 consecutive cases (from the Department of Surgery of the State University of Iowa), which have been studied in relation to the treatment for empyema, the endeavor will be made to emphasize these principles.

Arbitrarily, all cases entering the service within two months of the onset of the pleural infection have been grouped as acute and all the rest as chronic. These two groups will be examined separately. There were fifty cases in each group.

ACUTE EMPYEMA

Etiology. In the fifty cases of acute empyema, twenty, or 40 per cent, were in the first decade, the youngest being seven months. The oldest patient was seventy-one. Lobar pneumonia was the primary disease in twenty-eight, or 56 per cent; influenza in eighteen, or 36 per cent; three cases were primarily infections of the pleura, and one was a tuberculous empyema infected secondarily by pyogenic organisms. The average leukocyte count was 20,200.

Diagnosis. The diagnosis is usually suspected by the course of the primary disease. The suspicion is strengthened by the change in the chest signs indicating fluid rather than consolidation, is greatly aided by *x*-ray plates and fluoroscopic examination of the chest, but is only verified by exploratory aspiration. This is too often delayed, in spite of the fact that it is a relatively safe and simple procedure.

It is not alone sufficient to make a diagnosis of empyema, but the nature of the exudate should be studied as to its consistency and the organism producing it. This is important in relation to treatment.

Treatment. When should an empyema be drained? Formerly it was taught and practiced that the presence of a cloudy exudate in the pleura containing pyogenic bacteria was an indication for immediate operation. Experience obtained during the influenza epidemic showed that this was wrong.

The pleural reaction to various forms of pyogenic bacteria varies greatly. There is also considerable variance in the reaction to various strains of the same bacterium. Characteristically an infection of the pleura by the pneumococcus is productive of a thick pus containing much fibrin, and there is a marked tendency for the pleural surfaces of the lung and chest wall to adhere at the boundary of the accumulated exudate, to wall it off and localize it. A pneumococcic empyema should generally be drained as soon as diagnosed.

A streptococcic infection, on the other hand, is usually characterized early by a relatively thin exudate, with a small cell content and very little fibrin. There is only slight tendency for the exudate to be localized by adhesions forming between the two pleural surfaces, and there is relatively little early thickening of the pleura. Later in the course of the disease, the exudate may become more distinctly purulent and localized. A streptococcic empyema ordinarily should not be drained in the early stage. Pneumothorax with marked collapse of the lung will often occur. This may cause an early operative death from disturbance of the mediastinal equilibrium or from putting one lung out of commission when the other is crippled because of a pneumonic process. Aspiration of the exudate is the treatment of choice in a streptococcic empyema in the early stages and this may be repeated. It will sometimes lead to a cure. Usually, however, the exudate will reaccumulate and become thicker and will later demand drainage.

Anesthetic. Novocaine infiltration was used in fourteen cases. It may be used successfully at any age. The youngest in this series was eighteen months. It is particularly indicated if the patient is a poor risk because of an active pneumonia, or extreme debilitation.

Nitrous oxide-oxygen was used in thirty-four cases, or 68 per cent. We believe it to be the anesthetic of choice where no contraindications to its use are present. Each year we are using it more often in chest surgery. It must be given by an experienced anesthetist.

*Presented before the Southern Minnesota Medical Association at Mankato, December, 1922.
†From the Department of Surgery, University of Iowa.

Ether was used in only one case. It is rarely necessary in acute empyema.

Operation. Pus must be demonstrated at the time of operation by aspirating needle, before the pleural cavity be opened. This is fundamental. Failure to observe this may lead to serious trouble. It is not enough that some other physician or yourself found pus by needle at some time prior to operation, be it ever so short. An empyema cavity is often very elusive.

Intercostal drainage was done in eighteen of the fifty cases. It is reserved for the desperately sick, especially with an active pneumonia, and for children with elastic interspaces. Even in infants a rib resection is often indicated because the chest wall has shrunken and drainage between ribs is inadequate.

Rib resection is the procedure of choice and was done in thirty-two cases, or 64 per cent.

Closed drainage was performed in ten cases. It consists of making the usual incision and resecting the usual amount of rib. Before the cavity is opened, sutures are taken in the cut muscles, but not tied. The pleura is then incised and the drainage tube inserted into the empeyma cavity. A clamp is kept on the tube to prevent pus from escaping or air from being aspirated. The incision is then closed snugly around the tube. The clamp is now removed from the tube and the pus allowed to run out during expiration, the tube being closed with the finger during inspiration. After the cavity is emptied the patient is returned to bed with the tube connected with a longer one which is passed into a bottle of Dakin's solution sitting on the floor at the side of the bed. This prevents an early sudden pneumothorax, and probably tends to limit the size of the pneumothorax. It acts as a closed drainage for only a relatively short time, for within twenty-four hours to two weeks there is a passage of air and exudate around the tube. This procedure is used only in very early cases, in which there is less likelihood of a substantial localization of the process, and a marked pleural reaction following drainage is expected. In all cases used it proved very satisfactory.

The site of drainage of an empyema is of the very greatest importance. *Drainage should be provided at the most dependent portion of the cavity.* Observance of this rule would decrease markedly the number of cases of chronic empyema. Inasmuch as the patient will be in a recumbent or semi-recumbent position following operation for a variable time, the drainage had best be not only dependent but placed in the posterior portion of the cavity.

Post-operative Treatment. This is important and must be carefully supervised.

Dakin's irrigation of the cavity has been used as a routine in the past three years and has proved of great value. It early diminishes the amount of discharge, dissolves the fibrinous clots and decreases the symptoms of infection. Its place in the after-treatment of these cases is established. However, no case has been seen in which a sterilization of a cavity has been obtained allowing the early removal of drainage tubes and closure of the tract with the idea that the cavity would remain sterile indefinitely or until obliterated. Such a procedure is not fundamentally sound.

Bottle blowing and other forms of respiratory exercises are begun early and carried out methodically and seem to have definite if not marked value.

The tubes are shortened very early so that they pass *only through the thickness of the chest wall.* This is important because damage may be done to the visceral pleura in its expansion if the tubes impinge, and furthermore their presence alone in the cavity may determine its continuation. Tubes are dispensed with entirely only when the cavity is practically obliterated.

Complications. The peritoneum was opened in two cases. These will be discussed later.

Bronchial fistula occurred in two cases. One of these was the result of using force in reinserting a drainage tube during the convalescence of a case. The tube had been forced out by the expanding lung. Fortunately the fistula closed without further trouble.

Lateral sinus infection.

Acute mastoiditis and smallpox.

Pyemia.

Thrombo-phlebitis—femoral vein.

Diphtheria, two cases.

Mortality. There were nine deaths, or a mortality of 18 per cent. Of these, five died of causes which were not connected with the operation or were uncontrollable, such as lateral sinus infection, carcinoma of jaw, etc.

Of the remaining four, three were operated upon for streptococcic empyema as complication of influenza. Two of these had an active pneumonia at

the time of operation. In each the operation was probably a contributing cause of death. These were among the early cases of empyema in the influenza epidemic of 1918. They would be treated now by early aspiration rather than early drainage.

In the remaining case the peritoneum was opened and death was directly due to the operation. This will be discussed later.

Results. Of forty-one cases surviving operation, there was a permanent cavity remaining in two. In one of these a very definite mistake in judgment was made in draining the chest. The exudate was not purulent, and following drainage a very marked collapse of the lung occurred. The end result was a large cavity. This was operated upon at another clinic and a Delorme operation done. The second case was one in which a pneumothorax developed following an exploratory aspiration, at which time no pus was found. Infection of the pleura occurred later, and the partially compressed lung did not expand to obliterate the cavity entirely. A Delorme operation was attempted but gave no promise of success, so a pedunculated muscle flap was used to obliterate the cavity with success.

There was recurrence of the empyema in one case. This patient had a bronchial fistula at the time of his acute empyema, but it had healed satisfactorily. At the time of the recurrence the bronchial fistula was again demonstrated.

Thirty-eight cases, or 76 per cent, apparently obtained permanent cures.

CHRONIC EMPYEMA

Etiology. Judging from the history of the case obtained from the patient or his relatives, influenza, as the cause of the pleural infection, headed the list in this group of fifty cases, with a total of twenty-three, or 46 per cent. Lobar pneumonia was next with thirteen, or 26 per cent, primary pleurisy ten, tuberculous empyema three, and pulmonary infarct one. The greatest number, thirteen, occurred in the fourth decade.

Seventeen cases of the fifty had not been diagnosed as empyema until the process had been present for from two to twelve months and were then sent into our service for operation. Several of these had been sent to the State Tuberculosis Sanitarium at Oakdale with the diagnosis of pulmonary tuberculosis.

One patient was referred to surgery from the medical service after four aspirations had failed to clear up a streptococcic empyema complicating influenza.

One patient gave the history of pleurisy of six months' duration and the findings were those of fluid in the chest. He had a leukocyte count of over 20,000 and fever. The diagnosis was made of empyema and drainage done. Two drachms of pus which grew the pneumococcus on culture were found lying in a cavity with markedly friable walls. An apparent cure was obtained. The patient returned to the hospital six months later in a dying condition and a malignant tumor of the lung was found at autopsy.

The remaining thirty-one cases or 63 per cent had been previously operated upon. In twenty-two rib resection had been done and in nine intercostal drainage established. In four of the thirty-one, drainage had been done only after the infection had shown itself on the chest wall, pointing between the ribs.

Of the thirty-one cases which had been drained there was found rubber drainage tubing in two, which was the cause in each for the permanently draining cavity. In each a cure was established after removal of the tube. In one of these patients the tube had been in the cavity for twelve years. Its presence was not suspected for it cast no shadow in the *x*-ray plate. In the other the diagnosis was made by the *x*-ray.

One patient of this group of thirty-one had had drainage established by a competent surgeon for a supposed empyema two years ago. He was sent to our service because of a draining sinus. At operation a dermoid cyst, the size and shape of a grape fruit, was found. The cavity contained a large mass of cheesy material and matted hair, and the wall contained patches of skin-like epithelial tissue.

Three cases had been operated upon for what was clearly tuberculous empyema.

In the remaining twenty-five drained cases an attempt was made to determine from the history and the condition found, the reasons for failure to obtain cures. There were five outstanding causes for failure.

The commonest of these was failure to place the drainage opening at the dependent portion of the empyema cavity. In these cases there is a constant accumulation of pus below the level of the opening through the chest wall, with a continuation of infection, marked thickening of the pleura

and no opportunity for the cavity to become obliterated. Another frequent cause was the too early removal of the drainage tube. This allows a partial closure of the drainage tract until it becomes inadequate to drain the cavity satisfactorily and the cavity persists.

The third cause for failure was due to the too early drainage of the streptococcic empyema of influenza. In these cases the lung had greatly collapsed and the resultant cavity was so enormous that it never became completely obliterated by subsequent expansion of the lung, flattening of the chest wall and elevation of the diaphragm.

The fourth cause for failure was greatly delayed drainage of a large collection of pus. In these cases the lung is compressed due to pressure of the exudate and the visceral pleura becomes so thickened that expansion of the lung is markedly hindered.

The fifth cause for failure was the presence of a bronchial fistula. It is difficult to determine in any given case just how important this factor is in the maintaining of an empyema cavity. A communication between the cavity and a bronchus was present in fourteen of the entire group of fifty cases at some stage of the disease, judging from the history. The presence of a bronchial fistula was demonstrated conclusively in six by the injection of methylene blue or Dakin's solution. One of these died following operation. In only one of the remaining five did the cavity fail to close after proper drainage was established. This patient still has a bronchial fistula communicating with a narrow tract through the chest wall, and through it a probe may be passed as far as the hilus of the lung.

Treatment. Four of the fifty cases of chronic empyema were not operated upon.

Of the remaining forty-six, forty were treated by providing adequate drainage through rib resection. Three of these cases died following operation. The rest—thirty-seven in number—obtained apparent cures with the exception of the patient discussed above with the permanent bronchial fistula. One of the apparently cured returned one year later with an acute recurrence of his empyema. In all of these cases great pains were taken that the drainage provided should be dependent. In eight, drainage was made at two points in order to make sure that all portions of large and uneven cavities be adequately drained. All of these cases did very well.

After-treatment. Dakin's irrigation seems to have a greater value in this type of case than in the acute condition, and it is used as a routine. It is difficult to use in the presence of a bronchial fistula, because it is so irritating.

Respiratory exercises are also of definite value.

Great care must be used that drainage is not dispensed with too soon. With a small tube passed just through the thickness of the chest wall, it produces no pressure on the expanding lung and does not maintain the cavity by its presence.

Plastic Operations. These were done in six cases.

In two cases decortication was attempted. In each of these the cavity extended from the diaphragm to above the first rib. The operation was a failure in both cases, and an extensive collapsing operation was then done with only partially satisfactory results. These two patients will remain chronic invalids.

In one case of a draining tuberculous empyema a collapsing operation was done with marked improvement. The patient developed tuberculous peritonitis one year later. A collapsing operation was done in another patient with a double cavity, with a successful result.

In two cases, cavities of relatively small size were obliterated by turning in pedunculated muscle flaps. A cure was obtained in one. In the other an infected cavity still persists.

Mortality. Of the forty-six operated cases, death occurred in three, or 6.5 per cent. One patient aged fifty-three died twelve hours following a rib resection under eucaine anesthesia. No cause for death could be determined and autopsy was refused. Another patient developed a putrefactive infection of the operative wound following the drainage of a well localized cavity which communicated with a bronchus. He died on the tenth day. The third death was due to an extensive thrombosis of both common iliacs and the descending aorta which developed during an apparently normal convalescence.

Death occurred in one of the four unoperated cases. This patient had had a drainage operation two months before entering the hospital. She presented a small sinus which communicated with a bronchus. This sinus was injected with bismuth paste. Following this procedure she developed an extensive subdural abscess, which was drained. Autopsy showed no area of active infection in the

region of the sinus tract or bronchial fistula, and there was probably no relation between the injection of the bismuth paste and the intra-cranial infection.

SUMMARY

Too great stress cannot be laid upon the value of dependent drainage in the treatment of empyema. This is not without risk, however, and in these 100 cases an opening has been made into the peritoneal cavity in four. In three of these four cases pus had been first obtained by aspirating needle and the incision made over the rib either above or below the needle.

In case one, an acute empyema, rib resection was done and the peritoneum opened. The opening into the peritoneum was drained through the same incision as was the empyema cavity. About three weeks later a pelvic abscess developed which was drained per rectum and several ounces of sterile pus obtained. He developed a lobar pneumonia following this operation and died four days later.

Case two, an acute empyema, no pus was found by aspiration at the time of operation although it had been obtained a few hours before. Rib resection was done and the peritoneal cavity was opened through the diaphragm. The opening in the diaphragm was sutured and a rib resection done at a higher level. This entered the empyema cavity. This patient developed a subphrenic abscess which was drained and she obtained a cure.

Case three, a chronic empyema, rib resection was done and the peritoneum opened through the diaphragm. This was sutured and the empyema drained at a higher level. No complications developed.

Case four, chronic empyema, rib resection was done and the peritoneum opened below the diaphragm. This was drained by tube and another opening made at a higher level into the empyema cavity. No complications resulted.

Such an operative mishap may be guarded against by locating the pus with an aspirating needle before making the incision. It is very important that the needle be passed into the chest wall at *right angles* to it. After the rib has been resected over the cavity, then pus should again be demonstrated by needle before making an incision through the tissue beneath the resected rib.

The time to drain an infected pleural cavity is of the utmost importance and depends upon the character of the exudate.

Drainage must be maintained over a sufficient length of time.

Respiratory exercises during convalescence are of value.

All drainage material must be accounted for to make sure that it does not slip into a cavity and maintain infection.

Prolonged and adequate drainage of a cavity must be tried before a failure of cure is determined and plastic operation advised.

The decortication operation has failed in the few cases in which it has been tried in this series. The collapsing operations are often terribly mutilating, and in the average case I feel that the patient is better off with a permanently draining cavity which may be kept clean by daily irrigation.

A bronchial fistula has an inherent tendency to close, if adequate drainage of the empyema cavity is provided.

DISCUSSION

DR. C. H. MAYO, Rochester: I wish to thank the Committee for placing me on the list of speakers to open this discussion so that I may express my appreciation of the paper. It covers the subject thoroughly and takes me back to a realm of surgery with which I have had little to do recently.

The questions of diagnosis and the roentgen ray were not particularly discussed. The lung and pleural inflammations cover the major portion of empyema. Other cases occur with definite symptoms pointing to the condition. I think we must still find these cases by auscultation and percussion; the use of the needle is of the greatest importance, and it is seldom used until late. In passing the needle in I always like to insert it slightly obliquely with the rib until it passes the upper edge, and then turn it at right angles to insert deeper. Upon locating the pus I strap the needle with adhesive to prevent it from falling out; thus the possibility of losing sight of the pus, as suggested by Dr. Beye, is avoided. If the needle is definitely strapped in you can at least find the other end of it while it is still in place.

I think the roentgen ray sometimes leads to delay. I know that the roentgen ray does not always show that fluid is present. This fact can be best appreciated when the needle is inserted and fluid obtained. Last summer, in Rochester, New York, I saw a machine invented by Coolidge, which can be carried in a satchel. It is an oil immersion apparatus which works in heavy oil like the gear case on an automobile, and can be attached to any electric light socket. It gives a powerful current and is going to revolutionize roentgen-ray work. This, I believe, will be on the market some time this winter.

It is remarkable how quickly the mild infection, which is found on withdrawal of the fluid, becomes a large abscess. Two ounces of fluid drawn yesterday seemed to empty the cavity, but today on passing the needle a quart of fluid will be obtained, and the patient will be very sick.

Passing just beyond the period when ordinary inflammation of the lung should subside, when it fails to clear up, there is danger of empyema. If it subsides and the temperature again rises after rest of a day or two, then we also must look for empyema. Most of these cases can be found by means of the needle and the older methods. Dr. Beye's discussion recalled to my mind a particular patient from whom I removed three drainage tubes of good size. The doctor and the father of the patient were having a very argumentative and loud discussion in the operating room; the father said he knew those tubes were in and the doctor said they were not, that they had slipped down through the patient's trousers while he was walking around; I managed to slip them out quietly while they were talking. Always put a safety pin in no matter how safely in place the tube appears, and see that it is fastened with adhesive. Brewer has invented a flange tube which is to be used in large cavities, this tube can be folded and passed in. Another is slipped over the top so as to come up against the chest, drawing the inner one out, up against the pleura; the outer one is pushed up against the skin and it makes a very good double flange. While in Baltimore ten days ago I heard a report on two cases of empyema occurring within a few months in which the flange projected through an opening so close to the bottom of the pleura that it perforated the diaphragm. This is what Dr. Beye spoke of, an opening through the diaphragm and infection, a subdiaphragmatic abscess. It takes but little to go through the diaphragm.

Again I wish to express my appreciation of this paper because it is timely and calls attention to much that can be done, if it is done in time, and how often, even now, these cases go on to the utmost before they are recognized.

Dr. A. C. Baker, Fergus Falls, Minn.: It is not very often that we have the privilege of listening to a report of so great a number of cases. The essayist stated that he wished to emphasize the points that are well established at the present time. I think he has pretty well covered all the points in the treatment of empyema.

One thing mentioned was that the pneumococcic cases get well by early drainage. Historically, it is interesting to note that even Hippocrates made note of the fact that when you find an empyema with thick pus (pneumoccic), it should be drained; but in those cases where there is a rather thin secretion the patient may die if it is drained. Of course he did not recognize what the reason was, but it was because of the pneumothorax which took place in these cases where no adhesions are found and which prove so disastrous to the patient.

It might be well to reiterate some of the physiological points upon which we base our treatment of empyema cases.

In the first place it is well established that intrapleural pressure is less than the atmospheric pressure, and for reasons well known to all of us.

Secondly, that if an opening is made in the chest wall, collapse of the lung will take place. Graham and Bell established the fact of the definite relationship between the size of the opening in the chest wall and the size of the glottis. Knowing this, we can operate upon double empyema if we bear this in mind. The second consideration is that of the mobility of the mediastinum, knowing that the pressure on one side is just as great as on the other and that it can neither be raised nor lowered on one side, in acute cases, without doing a corresponding thing on the other side.

The third consideration is whether or not there are adhesions.

Lastly, the vital capacity of the patient, which differs in different people.

Historically, it is interesting to refer to the fact that Walter was the man who did the first rib resection in 1860. It was in 1879 that Estlander did his operation. From 1860 to 1890, a period of thirty years, the attention of the medical profession was directed towards the bringing of the chest wall down to the lung. The literature of the time occasionally hints at the fact that it might be a good plan to bring the lung out to the chest wall and it was Delorme who first dissected the pleura in a small cavity. Fowler, two years later, did a large operation and he usually receives credit for establishing the fact that it can be done. Several modifications have been made, for instance, (1) separating the ribs so as not to cut away much of the rib; (2) insufflation of the lung; (3) the use of gridiron incisions; and (4) sometimes suturing the lung to the chest wall. Since 1890 most of our attention has been directed towards bringing the lung out to the chest wall.

Knowing the hazard that may accompany some of these operations, it is wise to consider the more conservative methods. Doctor Hedblom has impressed upon us the value of Dakin's solution, especially in chronic cavities.

The principal cause of a chronic fistula is a chronic cavity; and a chronic cavity is there because we have pneumothorax, a foreign body, tuberculosis or reinfection, or there may a bronchial fistula or osteomyelitis of the rib. Knowing these things, as the essayist has stated, if you rule out osteomyelitis, tuberculosis and foreign bodies, the most important thing is to have adequate drainage or removal of the infection. As Doctor Hedblom has pointed out, there is no way in which this can be done so well as by dependent drainage and irrigation with Dakin's solution, and that means irrigation every two hours. It sterilizes the cavity, puts the patient in a better condition, disintegrates the membrane so that it becomes thinner and allows the lung to stretch out; on account of the lung coming closer to the surface we get a smaller cavity and in cases where operation must be performed the cavity will be small and we will not have to do one of those large deforming operations.

Having done these things—having treated our acute empyemas as the essayist has described and our chronic ones by ruling out osteomyelitis, foreign bodies and tuberculosis, and then thoroughly draining them at the most dependent portion of the cavity, sterilizing them by using Dakin's solution—then if they do not respond you will have to do a Delorme or some modification of the Estlander operation.

I wish to state that in empyema cases it is well to remember that when we are fooling around with a case of unresolved pneumonia many will be cured if you will just stick in a needle.

I am not going to say anything about tuberculous empyema, because I am sure Doctor Hedblom is going to speak on that subject.

Dr. C. A. Hedblom, Rochester, Minn.: It is a pleasure to listen to a paper so comprehensive and illuminating.

The essayist reports that 33 per cent of his chronic cases had progressed for from two to twelve months without having been recognized as empyemas. We have had cases at the Mayo Clinic, existing anywhere from two to eight years, a great many developing bronchial fistula and coughing up from eight ounces to a quart of pus every day. These cases have been diagnosed variously as bronchiectasis, tuberculosis, or abscess of the lung, and treated expectantly without excluding the possibility of empyema by the simple procedure mentioned by Dr. Beye of inserting a needle to see if there was pus in the pleural cavity. These patients come to us in the late stages of chronic suppurative processes, some with advanced myocarditis, chronic multiple arthritis and, in some cases, long-standing deformities of the whole thorax. We have observed undiagnosed cases of bronchial fistula of from two to eighteen years' duration. The subject is a timely one, for the idea seems to be firmly rooted in the minds of the profession that all cases of empyema belong to the same category and, therefore, that the same treatment, resection and drainage, will suffice for all. The chronic empyema observed clinically proves that we still have much to learn with regard to diagnosis and treatment of the condition.

The diagnosis of tuberculous empyema is not easy because the positive proof is not always forthcoming, even in the presence of what proves later to be a tuberculous empyema. In the case of a patient with a history of repeated attacks of pleurisy with effusion, or with a focus of tuberculosis elsewhere, coincident with empyema, in my opinion the assumption is justified that the empyema is tuberculous until proved otherwise. If no definite etiology can be found, I believe that the fluid should first be cultured, even if frank pus is obtained. If there is no growth on the culture medium, the empyema should be considered tuberculous until proved otherwise. If the patient comes with a draining sinus, as is usually the case, examination of the exudate will, in many instances, establish the diagnosis of tuberculosis. In certain cases it may require repeated examinations over a long period of time, just as it is often difficult to find bacilli in the sputum in certain cases of pulmonary tuberculosis; yet the failure to find them does not necessarily exclude tuberculosis, and in some cases in which bacilli are never found, the pleura will show the characteristic histological picture.

I am glad that Dr. Beye mentioned the relative merits of the open and closed methods of treatment in acute empyema, as this question is much discussed. Many adhere to the idea that the rib must be resected and an opening made in the chest wall to establish drainage. I believe that in acute, fulminating, streptococcic empyema open drainage is contra-indicated. The open drainage has much in its favor, particularly if one has not facilities for treating the case by the closed method, but if such facilities are available, the closed method is preferable. For instance if drainage by the usual rib resection is established in the case of an empyema of about two liters' capacity, evacuation by gravity of most of the pus is all that can be achieved. The lung remains more or less collapsed. It will usually expand, but one has no assurance that it will do so. If, on the other hand, closed drainage is instituted and two liters of pus are aspirated, the lung is expanded by that volume, the remainder of the pus is drained off, and the lung is expanded completely. By the proper use of a sterilizing solution, such as hypochlorite, not only has drainage been effected and the surfaces mechanically cleansed, but sterilization of the infection has in a large measure been effected. It is true that if an incision is made and tubes are sutured in, leakage will soon follow, but if a catheter is inserted through a trocar and cannula, using a tube that fits the cannula accurately, the opening will remain air-tight for from ten days to two weeks and with a little care can be maintained practically air-tight indefinitely.

If precautions are taken in irrigation to prevent air entering, the lung will remain expanded. By using a relatively large amount of fluid at each irrigation, all parts of the cavity are washed and encapsulation of any part is prevented. A sinus or a small pocket will result, for which a rib resection can be performed without material risk to the patient.

The treatment of chronic empyema is such a comprehensive subject that I can touch on only a few of the main points made by the essayist. I should like to emphasize that the chief cause of chronicity, according to my observations, is ineffective drainage. The most common reason for the ineffectiveness of drainage is that the drainage opening is allowed to close down to a narrow sinus, so that pus accumulates, and the cavity, if it has been partly obliterated, enlarges. The opening may have been at the right point and may have been large enough to begin with, but the drainage tubes are removed and the opening in the chest wall is allowed to close down before the cavity inside has become obliterated. There are other causes of chronicity, such as drainage material and other foreign bodies in the cavity. The essayist did not mention the sequestered fragments of rib. I believe that, when the rib is resected and the periosteum stripped off back of the point of resection, the denuded ends may become infected and sequestered fragments eventually drop into the cavity, infection persisting until they are removed.

The more one searches for tuberculosis, the more often one finds it in chronic empyema. We have had a series of 313 cases of chronic empyema, 10 per cent of which were proved tuberculous, and in another 10 per cent of which the presence of tuberculosis was assumed. During the last year, when we made a more careful study of these cases, the percentage of positive cases has risen to sixteen.

Chronic bronchial fistulas are also more often present than is generally recognized. In our series of 313 cases were fifty-four cases of bronchial fistula. Sometimes they can be recognized only by some such method as the injection of salt solution, or salt solution stained with a little methylene blue.

With regard to treatment, if the patient has a sinus a catheter is slipped in and the cavity irrigated persistently. It will usually decrease from 50 to 95 per cent in capacity; a small plastic operation is then performed to obliterate it completely. I am not optimistic enough to dismiss a patient with a cavity, however small, draining through a narrow sinus, because a good many, if not the majority, will have recurrence of the empyema. If the cavity will not become obliterated, decortication or a plastic operation may be re-

sorted to; it has been my experience, however, that unless the cavity is more or less globular, decortication will probably be of little value. It is usually not so effective if the cavity is large, long and narrow, or flat and thin. The cases for decortication should be chosen very carefully. In cases of large cavities that will not disappear under treatment, especially if of tuberculous etiology, an operation of the Wilms type in which the ribs are resected extrapleurally in segments under local anesthesia may be indicated. The whole cavity can be collapsed by this method with a minimum of operative risk, even in the presence of an active tuberculous process.

PHYSICIANS LICENSED AT THE APRIL, 1923, EXAMINATION TO PRACTICE MEDICINE IN THE STATE OF MINNESOTA

By Examination

Name	*Graduation*	*Address*
Daly, Joseph	Toronto, M.B., 1915	Rochester, Minnesota
Dickey, Lloyd Blackwell	U. of Minn., M.B., 1923	429 Union St. S. E., Minneapolis
Hemingway, Robert Wing	Rush, 4 Yr. Cert. Med., 1923	Mattoon, Wisconsin
Hofto, Jalmar Melvin	Rush, 4 Yr. Cert. Med., 1923	City Hospital, St. Paul, Minn.
Kernohan, Jas. Watson	Queens, Ireland, M.B., 1920	Rochester, Minn.
Kretzschmar, Karl Emil	U. of Rostock, Ger., M.D., 1911	Red Wing, Minn.
Lagersen, Raymond Wesley	U. of Minn., M.B., 1923	St. Barnabas Hospital, Minneapolis
Miller, Walter Herman	U. of Ore., M.D., 1922	City Hospital, St. Paul, Minn.
Simenstad, Lien Otis	Rush, 4 Yr. Cert. Med., 1923	Grand Forks, N. D. (Box 734)

By Reciprocity

Dumas, Alex. Geo.	Creighton, M.D., 1921	3201 43rd Ave. So., Minneapolis
Fuerste, Frederick	U. of Iowa, M.D., 1920	Proctor, Minn.
Gardiner, David Greth	Georgetown, M.D., 1920	City Hospital, St. Paul, Minn.
Gilliam, Randolph Moore	U. of Va., M.D., 1919	Rochester, Minn.
Gray, Ellis Barksdale	Harvard, M.D., 1918	623 Wash. Ave. S. E., Minneapolis
Hanson, Millard Charles	Rush, M.D., 1923	Wahpeton, N. D.
Hendricks, Wm. Anthony	U. of Pa., M.D., 1918	Rochester, Minn.
Holloway, Jackson Kenneth	U. of Pa., M.D., 1920	Rochester, Minn.
List, Walter Edward	Ohio Med. Coll., M.D., 1907	General Hospital, Minneapolis
Matthews, Adelbert Claude	Baltimore Med. Coll., M.D., 1903	Becker, Minn.
Mayfield, Alfred Lisle	Rush, M.D., 1917	Rochester, Minn.
McMurtry, Walter Campbell	McGill, M.D., 1905	Virginia, Minn.
Muhme, Norman Benedict	U. of Mich., M.D., 1921	Rochester, Minn.
Sahr, Walter Geo. C.	Loyola, M.D., 1921	2522 Fremont Ave. No., Minneapolis
Schipfer, Lloyd Albert	U. of Iowa, M.D., 1907	Bismarck, N. D.
Smith, Benjamin Franklin	Tulane, M.D., 1919	St. Peter, Minn.
Synhorst, John Benjamin	U. of Iowa, M.D., 1921	Rochester, Minn.

MINNESOTA MEDICINE

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VOL. VI JUNE, 1923 No. 6

EDITORIAL

The Doctor and the Public

Dr. Scofield's paper in this issue presents many questions to the medical profession which will repay careful study. As dangers from within, he cites commercialism, unethical conduct and petty jealousies. Might there not be added an apathy on the part of medical men towards public affairs and politics? Where do you find a civic association where medical men are looked up to as men whose opinions are of value? What do lawyers as a class think of expert medical testimony? How much effort are the medical men as a body making to educate the public as to what the medical profession in the past has meant for humanity?

Dr. Scofield states that the danger from without is the army of irregulars, paths, cults and healers. The danger from without is from an uneducated public opinion, which finds expression through the cults.

The basic factors underlying this state of affairs rest primarily on the shoulders of the medical profession itself. If the doctor shuts himself up in his shell and fails to make of himself a public spirited citizen of importance in his community, the end result is going to be worse than it is at present.

The medical men of Illinois have raised a sum of $10,000.00 for public health lectures, magazine and newspaper articles, and radio broadcasting of an educational nature. *Hygiea* and the *Northwestern Health Journal* are not going to reach the mass of the people who most need it. The suggestion has been made to the American Medical Association that they amplify the Brady idea in a campaign of public education along medical lines through the public press, and we think it a good one.

The osteopaths and chiropractors in Minnesota today number 500. The medical men number about 2,300. And yet on legislative matters these cults exert an influence over fifty per cent instead of what should be less than twenty per cent.

Dr. Scofield states, "As I see it all, the man in regular medicine has not been awake to his duties, possibilities and dangers. He has been self-centered, tending strictly to peddling his pills and welcoming the newest arrival."

What are we going to do about it?

—F. J. S.

Postgraduate Study

Experience in the late war clearly demonstrated that a great many physicians in this country had for some reason failed to advance their knowledge after medical school graduation at a rate commensurate with the advance of general medical education during the corresponding period. The reason for this laxity is somewhat difficult to ascertain. Lethargy, the necessity of attention to the demands of practice, failure to realize their shortcomings or the necessity of overcoming them, lack of facilities for postgraduate instruction, and many other causes may have been factors in bringing about this condition.

It is obvious that the experiences associated with the war were the means of rousing the profession to a realization of the necessity of keeping abreast of the times, medically speaking. This in its turn has produced a quickening of the forces which are calculated to furnish an opportunity for transmitting to the practitioner in an easily assimilable form the requisite information.

The demand for positions as assistants, for fellowships and for postgraduate study in this country

was never so great as it is today. The attendance upon such great conclaves as the Clinical Congress of North America, the various societies of this locality such as the Tri-State, as well as the enthusiastic acclaim with which the Minneapolis and St. Paul Clinic Weeks have been welcomed and supported, all bear eloquent testimony to a tendency on the part of the substantial medical practitioners, which bespeaks an improvement in the class of service which they will be able to offer the public in the future.

Anyone who has witnessed the spectacle of a large group of physicians assembled at 7 A. M. to remain in constant attendance until 11 P. M. day after day, attending lectures, clinics and demonstrations, must realize that there is a thirst for knowledge in such a body which is unquenchable.

One of the most illuminating features of this new order of things is the fact that those to whom the honor of offering instruction is delegated are themselves so greatly benefited by the exercise of the teaching function. The efforts required by those who impart knowledge of this nature under such stimulation acts as a great force in their own development.

The more universal the interchange of ideas between the practitioners and the specialists can be made, the more beneficial will be the results to the general public in whose behalf our arduous labors are performed.

It seems befitting and in keeping with the demands of the times that the Minneapolis Surgical Society at its May meeting decided to deviate from its usual custom of holding an evening meeting once a month, to amplify its activities by inviting physicians to attend a "Clinic Day" on the first Thursday of each month. Throughout this Clinic Day, demonstrations, lectures and clinics will be offered at the local hospitals, and in the evening the visiting physicians will be invited to attend a dinner and listen to the usual evening program, which will consist of case presentations and a scientific paper upon some topic of a surgical nature.

It is to be hoped that this innovation will offer to the general practitioners of this locality one more avenue to postgraduate education.

The Education of Laboratory Technicians

The modern practice of medicine, sometimes designated as the laboratory practice of medicine, has produced such rapid and radical changes in the character and methods of diagnostic procedures that in many cases organization of these procedures has hardly kept pace with our advancement. It is only a few years ago that the professor in his laboratory was waited upon by his *Diener* who took care of his specimens, ran his errands and often acquired a very expert familiarity with the professor's favorite methods of diagnosis and research. He was a hand-picked and hand-trained individual. The significant changes which have occurred are emphasized when one compares such a *Diener* with the organization of the modern laboratory in which numerous quite distinct technical trades and professions, involving a high order of skill and mental equipment, are grouped together for carrying out the routine processes of diagnosis.

Many have expressed concern over the question of the proper education and certification of this rapidly growing and important group of medical aides. Representative of these opinions is the paper by Dr. Walter E. King in the April number of MINNESOTA MEDICINE, and, in this number, the paper by Dr. Kano Ikeda. Naturally it is altogether desirable that as soon as any special trade or profession has reached a point where its fundamentals have become soundly established, some method of classification as to education and merit should be provided. The demand for satisfactory courses of instruction for such assistants is already finding a certain supply. It is possibly a matter of debate as to whether all of the innumerable classes of technical assistants are yet sufficiently capable of clear definition as to make it possible to set any clear standards of education or proficiency. We may, however, look forward hopefully to the time when the co-ordinated efforts of the members of the various technical branches and those of the medical profession which they serve will lead to more uniform standards of education and more clearly distinguishing criteria of individual fitness. That a college for technicians or degrees for technical proficiency are demanded at this time, is certainly subject to grave doubt.

H. E. R.

It is a great pleasure to welcome Dr. Donald K. Bacon as an assistant editor of MINNESOTA MEDICINE. At the last meeting of the Editing and Publishing Committee Dr. Bacon was appointed to replace Dr. Everett K. Geer, whose resignation had been tendered on account of his inability to devote

his energies to the work of the journal.

We take occasion at this time to express our appreciation of Dr. Geer's co-operation and interest in MINNESOTA MEDICINE and our regret that this step seemed advisable.

Dr. Bacon has for some months been of great service in the editorial work of the journal and has kindly consented to supervise the Book Review department. Any assistance which members can give Dr. Bacon in the matter of book reviews will be greatly appreciated.

MISCELLANEOUS

PROGRESS IN THE PREPARATION OF PANCREATIC EXTRACTS FOR THE TREATMENT OF DIABETES*

JOHN R. MURLIN
Rochester, New York

*Abstract of address presented before the Hennepin County Medical Society, April 17, 1923.

Science seldom advances by perfectly logical steps. A great discovery may set us on the way, but there often ensues a period of groping with little to show for the effort made. Minkowski's discovery that the pancreas is the seat of diabetes brought us out of the woods at the base of the mountain, but Banting showed the way to the summit. The history of intermediate efforts reveals many failures to realize upon the hope engendered by Minkowski's contribution. Zuelzer in 1908 came very near to success by means of his extract obtained from fresh pancreas purified of protein by means of alcohol very much as is now done by the Toronto investigators.

An additional vantage point was gained by the researches establishing the islet tissue as causally related to the disturbance in surface metabolism. The first to act upon the theory that the internal hormone of the pancreas is destroyed by trypsin was Croftan (1910). He was followed by Scott (1911), who attempted ligation of the ducts and consequent degeneration of the acinar tissue in 1911. Knowlton and Starling (1912) obtained improvement in the utilization of sugar by the heart by means of a pancreatic extract and Clark (1916) accomplished the same by perfusion of the pancreas.

The writer became interested in the subject in 1912, the motivating idea being that the duodenal mucosa might play a part in the activation of the internal as well as of the external secretion of the pancreas. Extracts were made in weak acid which stopped the excretion of sugar when injected intravenously into depancreatized animals. This effect, however, was complicated by the action of alkali and for three years we were diverted from the study of pancreatic extracts *per se*. Later, however, it was found that extracts made in weak acid and administered by stomach with glucose and weak alkali would restore to a limited degree the power to oxidize glucose.

Work was resumed in 1921 upon pancreatic extracts made in weak acid, and upon the perfusion method of Clark. The most recent results from the physiological laboratory at Rochester, N. Y., show that: (1) the extract in weak acid is stable at an H-ion concentration of PH 5.7; (2) it is not destroyed by heating to 80° C. for half an hour at a PH of 6.7-7.2, but is destroyed by this temperature at PH of 4.4-5.7; (3) it is not lost by dialysis for 4-12 hours through thin parchment paper; (4) the active principle (insulin) is probably not a protein; for its potency seems to be inverse to the N. content; (5) it is precipitated from watery solution in a high state of purity by three classes of substances: (a) alcohols—methyl, ethyl, propyl, butyl, amyl and capryl; (b) by trichloracetic acid and acetone; (c) in less pure form by ammonium sulphate in one-half saturation and by sodium chloride; (6) insulin can be obtained from the pancreas of the pig by perfusion in much larger amount per unit weight of pancreas than by extraction of the whole gland. It is also much purer when so obtained and therefore requires much less subsequent treatment than by crude extraction.

FURTHER OBSERVATIONS ON THE COINCIDENCE OF SHINGLES AND CHICKEN-POX

C. EUGENE RIGGS, M.D.
St. Paul

Since the publication of my article on this subject in MINNESOTA MEDICINE, November, 1922, I have received five letters from physicians calling attention to this interesting relationship. Four of these letters describe typical examples of herpes zoster followed by chicken-pox within the usual period of incubation of twenty-one days. In one instance, chicken-pox occurred in an adult. The fifth furnishes an excellent illustration of herpes zoster and chicken-pox occurring in the same person—a rare happening.

A brief summary of each, my professional confréres, I believe, will find not only interesting but confirmatory as well of my contention that these frequent coincidences are more than casual.

Case 1.—Dr. John W. Shuman, Professor of Internal Medicine, American University of Beirut, Syria, writes Dr. Drake as follows:

"Editor,

"MINNESOTA MEDICINE—

"It is interesting to note in connection with Dr. C. E. Riggs' article, 'Coincidence of Shingles and Chicken-Pox,' that I can tie him with a similar coincidence in our own household. Madame Graham developed herpes zoster (costal) December 3rd. My son, Richard, age 7, two weeks later, developed chicken-pox, and his brother, John, age 9 years, one week later, had the same affliction. Up to the time of the first lad's trouble, no cases were in the community (American) school. Since, there have been a number of cases. Our third and youngest, aged three years, daughter Jeanne, today shows slight skin lesions of chicken-pox. All three have been vaccinated. Just what is the relationship, if any, of herpes zoster and chicken-pox?"

Case 2.—Dr. H. M. Sybilrud, Bricelyn, Minn., writes:

"I received your reprint on 'The Coincidence of Shingles and Chicken-Pox' about two weeks ago. It so happened that at that time I was treating a case of herpes zoster, right thoracic region. This evening, much to my surprise, a member of this family asked me about the incubation of chicken-pox. Naturally, I became inquisitive and obtained the following history: On February 1, 1923, Mrs. M., age 54 years, came to see me, with a typical case of herpes zoster of three days' duration. She was accompanied by her daughter and son-in-law, who lived with her. On February 15, 1923, the latter had a severe chill and fever during the night. The next day he found himself covered with a chicken-pox rash. I saw the case today, February 24, 1923. There were several typical chicken-pox scabs remaining on his body. The other members of the family had all had chicken-pox. There was no history of exposure in this case."

Case 3.—Dr. J. E. Chassell, Belle Fourche, S. D., writes March 19, 1923:

"Have just been reading your article, 'Coincidence of Shingles and Chicken-Pox'; it recalled to mind a case of shingles in an elderly woman last spring and that there were two cases of chicken-pox in the same family. I was called to see this woman May 24, 1922, and found she had a severe case of shingles. June 12, a grandson, aged five years, came down with chicken-pox; another grandson had it three weeks later. I do not know of any other case of chicken-pox anywhere around, at or near this time. Had there been, I think I should have known it as I am City Health Officer and County Superintendent of Health. I am giving you this information and you can take it for what it is worth."

Case 4.—Dr. H. E. Webster, of Duluth, Minn., writes:

" 'The Coincidence of Shingles and Chicken-Pox' did not strike me until I read your paper and as the literature on this relation is absolutely silent, I thought you might be interested in learning of my experience. A father consulted me about a rash which he had on his left side, which I diagnosed as herpes zoster. Ten days or two weeks later, I was called to his house to see his small daughter—about seven years of age—and found her suffering from a beautiful case of chicken-pox."

Case 5.—A neurological confrére writes than on March 20 his wife experienced pain in the small of the back; this gradually increased in severity. Three days later it became very severe and localized itself entirely to the left of the spine. There was a slight temperature at night; she was sleepless and very restless. Associated with the pain was muscular twitching of a myoclonic nature, which affected the left abdominal area above the navel. This was followed by a typical herpetic eruption about three inches wide in the same region. On the day of its appearance, there was noticed distinct papules—one on the right arm and one or more on the left trunk below the zone of eruption. For several days, similar papules with slight vesicular tips appeared on trunk, neck, face and in the hair—about a dozen in all. These have now disappeared with the exception of one more prominent papule, which had for a time a distinct reddish hue, slightly indurated at the center. The eruption resembled in every way that of chicken-pox.

This differed from LeFeuvre's cases in that it occurred on the same day as that of the herpes, while in his there was an interval of from two to five days between them.

To the American cases reported in medical literature, through the courtesy of my confréres, I am able to add five more. I have also received two inquiries regarding the treatment of herpetic neuralgia in elderly people. According to Sicard, this never occurs under thirty years of age. If the pain persists for months, recovery is rare. After a year's duration, it may be regarded as permanent. Treatment is most unsatisfactory. Injections of alcohol and section of the posterior roots have been disappointing. The application of the constant current for the relief of pain may give marked benefit and as a form of therapy is not to be despised.

Two facts should be emphasized:

(1) Herpes zoster may give rise to an epidemic of chicken-pox.

(2) Chicken-pox may give rise to herpes and since the latter is a serious menace to elderly people, every precaution should be taken to guard against their exposure to this disease.

OBITUARY

LIEUT.-COL. WILLIAM MALLOCH HART, M.C., M.D.

The recent death in Ottawa of William Malloch Hart, of intestinal obstruction following appendicitis, brings to attention the life of a doctor that has reflected rare honor on our profession, and brought forth from his Canadian confrères and friends a most unusual burst of human feeling, admiration and pride.

While he was not in Minnesota long enough to become a member of this, our State Society, still he is destined to have a very high position in the medical historical annals of Minnesota, particularly dealing with the control of tuberculosis. The recent thorough review of the epochal events in the campaign against tuberculosis in our own state has just appeared in the May number of MINNESOTA MEDICINE, from the pen of Dr. Longstreet Taylor, who was in this most necessary field of disease prevention decades ahead of his time. In naming over some of those connected with the early work, much of the credit apportioned to the writer by Dr. Taylor, for early legislative effort and county work, was really due to Dr. Hart. The writer first met him when he was still a bed patient with two hours of daily cautious "sitting up" at Saranac Lake.

He came out to Duluth and located Nopeming Sanatorium about one year later. His choice of a site was made on the same percentage method of determination that he chose a room to live in while the first administration building was being erected; 15 per cent was the value set against "convenience and accessibility"; 10 per cent for "sunlight and ventilation," etc. This gives a hint of his fundamental

approach to any of life's problems; it shows why he succeeded where so many fail; and why, in his success, he pointed the way to hundreds and thousands of others. Most of all did he show to all with whom he came into close contact, what it really meant to "live the cure for tuberculosis," and transform it from a hideous interference with a chosen vocation into the glowing purpose of one physically redeemed.

The first hot, salty certainty of an early hemoptysis came to him at a time when the whole horrible idea of pulmonary tuberculosis assaulted his consciousness with a heavy and devastating hand. It is well known that men who themselves have had tuberculosis make the best sanatorium executives. The reason for this is evident: years afterwards he feelingly asserted that he never began to overcome his lung lesion until he had overcome himself; this turning point came to him gazing up into the starlight heavens from his "Klondyke bed" in the Adirondacks. There he won the battle; the subjugation of his own hostile attitude built upon his own prearranged plan. This over, he entered a new life, and the brief recital of his accomplishments shows again the great virility of the transplants—the tribute to the Great Teacher Trudeau—for like many others, he proceeded to spread the idea of the curability of tuberculosis across this great American continent.

Let the minister who gave his funeral eulogy speak:

"Like a knight of the Middle Ages, seeking a foeman worthy of his steel, William Hart learned early what his life work was to be—fighting the terrible White Plague. In the great Sanatorium of Saranac he learned the magnitude of his task and the best methods of accomplishing that task. At Duluth he soon had an opportunity of giving practical effect to what he had learned. So highly appreciated were his services there that when he resigned to take up work in his motherland the directors of the great hospital he had organized requested him to name his successor, agreeing to appoint him without advertising the vacancy. That nominee still directs the work in Duluth with success and mutual satisfaction.* What William Hart accomplished in organizing the work in the neighboring province of Saskatchewan is known to all the medical men present and needs no word from me.

"When the Great War broke out he was among the first to enlist, and he enlisted as a private. A man of his gifts and training was soon called to positions of higher responsibility. As to the spirit in which his services were rendered, ample testimony is borne by that military cross conferred upon him by his King. The ability which characterized his work is revealed by his rise from the ranks to the high honor and responsibility of a Lieutenant-Colonelcy. Our presence and sorrow here today disclose with what pride, love and sympathy we follow his steady advance."

*Dr. Arthur T. Laird.

The man whose life had been despaired of for nearly three years, went, with his regiment, into the second great battle of Ypres, and, "with his always characteristic devotion to duty, advancing too far in aiding his wounded men, was made prisoner." He sent to some of his American friends a copy of a personal diary, reciting the events and circumstances of his capture and life in the German prison. It was singularly free of any taint of personal hostility to his captors; it amplified and elevated every possible evidence of their thoughtfulness and care. After his transfer as a prisoner of war he was placed in charge of the Canadian tuberculosis hospital at Lenham, in the south of England. Later, after demobilization, and on his return to America, everyone was astonished by the degree of physical recuperation he presented.

It will do us good at this time to review these features of his life. Despite the decrease in the incidence of tuberculosis, now so greatly appreciated, there is still a very fair number of our own fellows who have to submerge their personal ambitions in the awful knowledge that they also have the dreaded disease. Let them get a feeble reflection of the inspiration of his life from this very incomplete recital.

E. L. TUOHY.

DR. ARTHUR B. ANCKER

Dr. Arthur B. Ancker, for forty years superintendent of the City and County Hospital, Saint Paul, died suddenly in his office, May 15, 1923, at the age of 72. Dr. Ancker had been suffering from myocarditis for the past three years but had so successfully withheld the fact from even his more intimate associates that his death came as a distinct shock.

Dr. Ancker was born in Baltimore, March 20, 1851, and spent his youth in that city. His first inclination was towards the sea, but finally he studied medicine in the Medical College of Ohio in Cincinnati. He went to Saint Paul directly after graduation in 1882 and practiced there until the next year when he was named superintendent of the Saint Paul City and County Hospital upon its re-organization in 1883.

On August first of this year, Dr. Ancker would have completed 40 years as superintendent of the hospital. It was largely through his untiring efforts and his particular genius for organization and administration that the hospital grew from its small beginning to the magnificent hospital of 800 beds which it is today. The original hospital was a modified dwelling purchased from Dr. Jacob Stewart which occupied the present site of the hospital. Addition after addition has been added to the hospital until the present physical valuation of the institution is more than $2,500,000.00.

As superintendent of the hospital, Dr. Ancker was continually making plans for improvements. This year his efforts were bent toward procuring the appropriation for a new building for the contagious department but unfortunately the appropriation was not obtained.

Dr. Ancker was a member of the organized medical profession and also a member of the American Hospital Association and of the editorial board of *Hospital Management*. He was for a time president of the American Hospital Association.

Dr. Ancker is survived by his widow, by three sisters, Mrs. Delia Elkins, Hartford, Connecticut; Mrs. Adolph Bitterman, Evansville, Indiana; Miss Ella Ancker, Saint Louis and a brother, Abram Ancker, Evansville, Indiana.

DR. A. M. EASTMAN

The following resolution was passed by the State Board of Medical Examiners at the time of the death of Dr. A. M. Eastman, which occurred February 24, 1923:

It is with deep sorrow that we chronicle the death of our esteemed colleague, Dr. A. M. Eastman. He had been a member of the Board for six years.

From the first meeting, he evinced an intelligent interest that never waned. Always ready with most sane and wise advice, he was also ever anxious to do any amount of work necessary for the success of the Board.

His courtesy and geniality, his exuberance of spirit and humorous wisdom were always a delight and a never failing wonder to his brother members.

We, who knew him best, who have experienced his many fine qualities, are loath to believe that we can never again have his cheering presence with us.

To his family we extend our most heartfelt sympathy in this bereavement which we share with them.

THOMAS MCDAVITT, M.D.,
Secretary,
Minnesota State Board Medical Examiners.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

UNIVERSITY GRADUATE SCHOOL

Professor K. S. Wenckebach, Professor of Medicine at the University of Vienna, internationally known for his work on the heart will give the following lectures at the University under the auspices of the Graduate School:

Monday, June 4th, 4:30 P.M.
Tuesday, June 5th, 4:30 P.M.
Wednesday, June 6th, 1:00 A.M.

The profession is cordially invited to attend.

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

The mid-summer session of the Southern Minnesota Medical Association will be held at Faribault, June 11, 1923. Headquarters will be at the Minnesota School for the Deaf where all sessions will be held and the luncheon and banquet served. The proceedings will be more of a clinical character than ordinarily.

At the banquet to be held in the evening, Dr. C. H. Mayo will make an address on "The European Clinics of Today."

The program includes the following clinics:

Dr. D. E. McBroom, Faribault—Types at the School for Feeble Minded and Colony of Epileptics.

Drs. O. W. Rowe, Duluth, H. F. Helmholz, Rochester, Walter Ramsey, St. Paul, and F. C. Rodda, Minneapolis—Pediatrics.

Dr. J. N. Tate, Faribault—Education and Care of the Deaf.

Drs. S. Marx White, Minneapolis, R. M. Wilder, Rochester—Insulin.

Dr. Archibald MacLaren, St. Paul—Gastric Ulcer.

Dr. A. W. Adson, Rochester—Neurological Lesions.

Dr. E. Starr Judd, Rochester, will present a paper on "Management of Infections of the Biliary Tract" and Dr. Archie Wilcox, Minneapolis, one on "Problems of Industrial Surgery."

At the business meeting of the association, important matters bearing on the changing of the dues, number of meetings each year, the place of meeting, etc., as considered in former sessions, will be formally voted on.

The meeting will be concluded about 9:30 in the evening so that those driving may leave for home the same evening.

Dr. F. U. Davis, Faribault, is chairman of the Committee on Arrangements.

NEW CANCER SOCIETY

It has been proposed by many physicians to form an American Society for the Scientific Study of the Medical Aspects and Treatment of Cancer, the exact name and plan of work to be determined after it is organized.

As so many of the profession expect to gather at the coming meeting of the American Medical Association, in San Francisco, June 25 to 29, this year, it has been thought that that occasion would offer a good opportunity for the consideration of the matter. The plans, scope and details, and also the name of the Cancer Association could then be worked out, and the organization effected.

A call has been issued to those especially interested to come together in San Francisco and form the proposed association.

McLEOD COUNTY MEDICAL SOCIETY

A meeting of the McLeod County Medical Society was held at Glencoe, Saturday, May 5, 1923, with a record attendance. The principal address was given by Dr. John L. Shellman, Saint Paul, his subject being "The Eye."

A banquet was given in honor of the attending physicians in the offices of Drs. Schmidt, Langhoff, Tift, Beruns and Jungclaus, which had been converted into a banquet hall with suitable decorations for the occasion.

NORTHERN MINNESOTA MEDICAL ASSOCIATION

The annual meeting of the Northern Minnesota Medical Association will be held June 4, 5 and 6, 1923, in Alexandria. The names of those who will participate in the program appeared in the April issue of MINNESOTA MEDICINE.

Sinclair Lewis, the novelist, brother of Dr. C. B. Lewis, president of the association, will address the meeting Monday evening, June 4.

PARK REGION MEDICAL SOCIETY

The quarterly meeting of the Park Region Medical Society was held at Fergus Falls, Wednesday, May 2, 1923, followed by a banquet served at the Kaddatz Hotel.

The scientific program included the following papers:

Dr. W. W. Drought, Fergus Falls—Some of the Old Pioneers in Surgery.

Dr. A. J. Lewis, Henning—Some of the Interesting Complications of Pregnanacy and Labor, With a Report of Cases.

Dr. A. B. Cole, Fergus Falls—Medical Legislation of the Last Session of the Legislature.

Dr. O. M. Haugan, Fergus Falls—Diabetes and the Insulin Treatment.

The discussion of the evening was chiefly concerned with Dr. Haugan's paper. The society accepted the invitation of Dr. W. S. Broker to hold the next meeting in July at the Otter Tail County Sanatorium.

OF GENERAL INTEREST

Dr. A. Mahowald, formerly of Richmond, is now located at Breckenridge, Minnesota.

Dr. and Mrs. J. W. Andrews, of Mankato, recently returned from a trip to South America.

Dr. and Mrs. Abrams, of Rochester, are the parents of a son, Robert James, born May 3, 1923.

Dr. Justus Ohage, Jr., Saint Paul, announces the removal of his offices to 640 Lowry Bldg.

Dr. L. W. Barry, Saint Paul, addressed the Washington County Medical Society, April 8, 1923, at Stillwater.

Dr. and Mrs. F. R. Woodard, Minneapolis, have returned from a three months' stay in Daytona, Florida.

Dr. and Mrs. Horace Lyons, of Rochester, are the parents of a baby daughter, Alice Murdock, born May 10, 1923.

Dr. Robert Emmett Farr, Minneapolis, gave an address before the Illinois State Medical Association at Decatur, May 16.

Dr. L. W. Barry, Saint Paul, has severed his connections with the Miller Clinic and has opened offices at 810 Lowry Building.

Dr. F. J. Hirschboeck and Dr. W. R. Bagley addressed the members of the Interurban Academy of Medicine at Duluth, May 17.

Dr. Charles W. More, of Eveleth, was appointed by Governor Preus recently as a member of the advisory commission of the state sanatorium.

Dr. A. W. Ward, of Minneapolis, is now in Europe where he will spend three months in post graduate surgical work at Paris, Berlin, Vienna and Rome.

Dr. A. W. Adson, of Rochester, was recently elected president of the Rochester Civic Association, a new civic club which is a merger of all the civic organizations in the city.

The Merriam Park Hospital has announced the completion of its obstetrical service under the direction of a superintendent and an associate especially trained in this service.

Dr. P. F. Holm, of Wells, is now located in Los Angeles, where he will continue the practice of medicine. Dr. Holm has been a practicing physician at Wells for twenty-four years.

The American Urological Association held its twentieth annual meeting in Rochester, May 21, 22, and 23, 1923. Dr. W. F. Braasch, of the Mayo Clinic, had charge of the local arrangements.

Dr. and Mrs. Frank E. Burch and Dr. and Mrs. George Earl, of Saint Paul, have returned from a trip to Panama and South America in connection with the American College of Surgery.

Dr. Walter G. Sahr, who recently returned from Eruope where he spent two years in the study of surgery at Vienna and Budapest, has located in Hutchinson for the practice of his profession.

Dr. Clarence A. Ryan, who has been superintendent of the Buena Vista Sanatorium, Wabasha, for the past year, resigned from his position June 1. As yet nó one has been appointed to succeed Dr. Ryan.

Dr. G. E. Rice who received advanced degrees in surgery from the University of Minnesota, April 2, left Rochester May 18, 1923 for Pueblo, Colorado, where he is to be connected with the Pueblo Clinic.

Announcement has been made of the engagement of Miss Jane Hayner, daughter of Mr. and Mrs. R. C. Hayner, of Minneapolis, to Dr. Adolph H. Ahrens, of Saint Paul. The wedding will take place early this month.

The name of Parkview sanatorium has been given to the former Hopewell hospital, Minneapolis. Announcement of the change in name was made by Dr. Walter E. List, superintendent of the Minneapolis general hospital, a short time ago.

Dr. F. N. Bjerken, formerly of St. Hilaire, is now associated with Dr. E. H. Smith, at Bemidji, in the practice of medicine. Dr. Bjerken recently returned from Chicago where he has been engaged in post graduate work for the past year.

Dr. Thomas Lowe, of Pipestone, who was recently reappointed to serve a term of three years on the State Board of Medical Examiners, has a record of seventeen years in service on the board. Dr. George B. Weiser and Dr. Ida McKeen were also reappointed.

Dr. Virgil J. Schwartz, of Minneapolis, has returned from a six months' European tour where he visited the principal continental and English medical centers. Dr. Schwartz has opened his offices at 507 Physicians and Surgeons Bldg., for the practice of ophthalmology and otolaryngology.

Dr. Kenelm H. Digby, Dean and Professor of Medicine of the Hongkong Medical College, Hongkong, China and Dr. Oskar Frankl, Professor of Gynecology, University of Vienna gave Mayo Foundation lectures, May 10, 1923, to the staff and Fellows of the Mayo Foundation. Dr. Digby's subject was "The Functions of the Tonsils and Appendix." Dr. Frankl's subject was "The Relation of Cancer of the Stomach to the Female Sexual Organs."

At the annual meeting of the Minnesota Pathological

Society held in the Institute of Anatomy, University of Minnesota, Tuesday evening, May 15, 1923, the following officers were elected for the coming year: President, Dr. H. B. Sweetser, Minneapolis; vice-president, Dr. Paul Berrisford, Saint Paul; secretary-treasurer, Dr. E. T. Bell, Minneapolis; councilor, Dr. E. L. Gardner, Minneapolis. Dr. Hal Downey, retiring president, addressed the assembly on "The Occurrence and Significance of the 'Myeloblast' Under Normal and Pathologic Conditions."

Two hundred and fifty physicians of the Tri-State District Medical Association recently completed a tour of the East for the purpose of visiting the clinics and hospitals throughout the eastern states. Physicians from Minnesota included the following: Drs. A. E. Booth, M. N. Leland, F. J. Pratt, F. C. Rodda, L. A. Nippert, Ivar Sivertsen, John O. Taft, Minneapolis; Drs. Herbert Bolstad, H. Buscher, S. G. Cobb, A. Christiansen, E. C. Eshelby, M. M. Ghent, O. J. Sohlberg, Paul H. Kelly, W. A. Dennis, C. L. Larsen, F. H. Neher, W. H. Von der Weyer, W. W. Lewis, C. H. Zander, Philemon Roy, H. T. Nippert, W. C. Rutherford, A. E. Comstock, Saint Paul; Drs. Henry W. Meyerding, D. F. Hallenbeck, L. W. Pollock, Verne C. Hunt, Rochester; and Dr. W. R. Humphrey, Stillwater.

NEW AND NON-OFFICIAL REMEDIES

During April the following articles have been accepted by the Council on Pharmacy and Chemistry for inclusion in New and Non-official Remedies:

ABBOTT LABORATORIES:

Neutral Acriflavine-Abbott.
Tablets Neutral Acriflavine-Abbott, 0.03 gm. (½ gr.).
Enteric Coated Tablets Neutral Acriflavine-Abbott, 0.03 gm. (½ gr.).

HYNSON, WESCOTT & DUNNING:

Phenoltetrachlorphthalein-H. W. & D.
Ampules Phenoltetrachlorphthalein-H. W. & D.

MALLINCKRODT CHEMICAL WORKS:

Carbon Tetrachloride Medicinal-M. C. W.

MERCK & CO.:

Skiabaryt (for rectal use)- Merck.
Skiabaryt (for oral use)-Merck.

POWERS-WEIGHTMAN-ROSENGARTEN CO.:

Carbon Tetrachlorid C. P.-P. W. R.

NON-PROPRIETARY ARTICLES:

Neutral Acriflavine.
Carbon Tetrachloride Medicinal.

NEW AND NON-OFFICIAL REMEDIES

Tincture No. 111 Digitalis-P. D. & Co.—A fat-free tincture of digitalis which, standardized by the minimum lethal dose frog heart method of Houghton, is 50 per cent stronger than tincture of Digitalis-U. S. P. The actions and uses of Tincture No. 111 Digitalis-P. D. & Co. are the same as those of tincture of digitalis. It was introduced at a time when the "fat" of digitalis was believed to cause gastric disturbances. This claim of superiority is not tenable and the preparation is sold simply as a standardized tincture of digitalis. To minimize deterioration through light and air, the preparation is marketed in one-ounce amber vials and saturated with carbon dioxide. Parke, Davis & Co., Detroit, Mich. (Jour. A. M. A., April 7, 1923, p. 1003.)

Borcherdt's Malt, Cod Liver Oil and Iron Iodide.—Each 100 c.c. contains ferrous iodide 0.88 gm. (4 grains per fluid ounce), cod liver oil 25 c.c. and Borcherdt's malt extract (plain) 75 c.c. Borcherdt's Malt Extract Co., Chicago. (Jour. A. M. A., April 21, 1923, p. 1143.)

Carbon Tetrachloride Medicinal.—Carbon Tetrachloride has narcotic and anesthetic properties somewhat similar to those of chloroform. It has recently come into use as a vermifuge in the treatment of hookworm disease. It also removes some intestinal parasites other than the hookworm. It is reported that usually about 95 per cent of the hookworms are removed by the first dose. Its use appears to be relatively safe, but serious symptoms and even death have been reported. It is administered in water, milk or gelatin capsules on an empty stomach, followed by a purgative dose of magnesium sulphate.

The dose is from 2 c.c. to 3 c.c. (30 to 45 minims) for adults. Carbon tetrachloride is a heavy liquid, having an odor somewhat like that of chloroform. It is almost tasteless and almost insoluble in water.

Carbon Tetrachloride Medicinal-M. C. W.—A brand of Carbon Tetrachloride Medicinal-N. N. R. Mallinckrodt Chemical Works, St. Louis.

Carbon Tetrachloride C. P.-P. W. R.—A brand of Carbon Tetrachloride Medicinal-N. N. R. Powers-Weightman-Rosengarten Co., Philadelphia. (Jour. A. M. A., April 21, 1923, p. 1143.)

Modified Pneumococcus Vaccine.—A vaccine or "antigen" prepared by digesting a suspension of pneumococci, Types I, II, III and Group 4, at 37 C., until about 95 per cent of the organisms have become gram-negative and the mixture is relatively non-toxic to guinea pigs. It is believed that this method yields a vaccine with greater protective power. There is some evidence that this vaccine is of value in the treatment of lobar pneumonia. It is not intended for prophylactic use.

Pneumococcus Antigen-Lilly.—A modified pneumococcus vaccine-N. N. R. It is marketed in 5 c.c. vials, each c.c. containing twenty billion partially autolyzed pneumococci. Eli Lilly & Co., Indianapolis, Ind. (Jour. A. M. A., April 21, 1923, p. 1143.)

Sulpharsphenamine-Squibb.—A brand of sulpharsphenamine-N. N. R. (See Jour. A. M. A., March 31, 1923, p. 919.) It is supplied in ampules containing, respectively, 0.1 gm., 0.2 gm., 0.3 gm., 0.4 gm., 0.5 gm., and 0.6 gm. E. R. Squibb & Sons, New York City. (Jour. A. M. A., April 21, 1923, p. 1143.)

Neo-Silvol.—A compound of silver iodid with a soluble gelatin base containing 18 to 22 per cent of silver iodid in colloidal form. Neo-silvol, even in concentrated solutions, causes neither irritation of mucous membranes nor coagulation of albumin. It does not stain the skin. It is claimed that neo-silvol in laboratory tests for germicidal value has been found as effective as phenol in its action on bacteria. Neo-silvol is intended for the prophylaxis against, and treatment of, infections of accessible mucous membranes, and is claimed to be indicated in affections of the genito-urinary tract and of the eye, ear, nose and throat. Parke, Davis & Co., Detroit, Mich. (Jour. A. M. A., April 28, 1923, p. 1218.)

Phenoltetrachlorphathalein-H. W. & D.—A dibasic dye formed by the condensation of phenol and tetrachlorphathalic acid or its anhydride. Phenoltetrachlorphthalein has been used for the determination of the functional output of the liver. It can be used, *in the form of the sodium salt,* intravenously; but cannot be given subcutaneously or intramuscularly. The substance may also be obtained in the form of Ampules Phenoltetrachlorphthalein containing a solution of disodium phenoltetrachlorphthalein. Hynson, Wescott & Dunning, Baltimore, Md. (Jour. A. M. A., April 28, 1923, p. 1218.)

PROPAGANDA FOR REFORM

Ethylene as an Anesthetic.—The Council on Pharmacy and Chemistry has published a preliminary report on the experimental status of ethylene as an anesthetic. A. B. Luckhardt and J. B. Carter report that animal experiments with ethylene indicate that ethylene has a direct action on the nervous system when a concentration of 90 per cent is used; that the motor reflexes are abolished at this concentration, and that the phenomena produced by the undiluted gas are partly asphyxia, which factor can be removed by the addition of oxygen, when it is seen that narcosis results from the thylene itself. Trials carried out on human subjects appear to confirm the anesthetic value of ethylene. The investigators believe that ethylene will be found more desirable than nitrous oxid, but the experiments reported have been carried out on persons in normal health only. The Council reports that confirmation of the work is necessary before ethylene can be admitted to New and Non-official Remedies, but that further research with the gas is warranted. As a preliminary to such research, the Council cautions that the quality of the product must be determined. (Jour. A. M. A., April 7, 1923, p. 1003.)

Zonite.—Zonite is advertised as a new and wonderful discovery based on the "Carrel-Dakin" solution. The propaganda is, in effect, a capitalization of the work of Carrel-Dakin and others. Chemically Zonite, after dilution with an equal quantity of water, is claimed to be essentially the same as Surgical Solution of Chlorinated Soda (Carrel-Dakin) of New and Non-official Remedies.

Zonite has been exploited to both physicians and the public. (Jour. A. M. A., April 7, 1923, p. 1024.)

Owl Enamel Toilet Cream.—This preparation, manufactured by the Owl Drug Co. (Kansas City, Mo.), is sold for the alleged purpose of "Beautifying the Complexion and Rendering the Skin Soft and Velvety." Dr. Henry W. Woltman of Rochester, Minn., has reported a case of lead poisoning in a woman who had been using Owl Enamel Cream. The A. M. A. Chemical Laboratory analyzed the product and found it to be composed essentially of lead carbonate, calcium carbonate and glycerin. The indiscriminate sale of a preparation of this sort is not merely a menace to the public health but a commentary on the laxity of our laws. It is notorious that certain salts of lead have for years been responsible for cases of chronic lead poisoning, due to their employment in cosmetics. In spite of this any concern, responsible or irresponsible, can sell for indiscriminate use a cosmetic loaded down with poisonous ingredients. (Jour. A. M. A., April 7, 1923, p. 1022.)

Alcohol and Disease.—Recently a statistical report regarding the possible influence of alcohol on the prognosis of pneumonia in a large municipal hospital has been published. The data for nearly 3,500 cases of lobar pneumonia showed that, with reference to the patient's habits of indulgence in alcoholic drinks, that the mortality was higher in moderate users than in light users or abstainers, and that the mortality is much higher in excessive users than in moderate users. It must be borne in mind, however, that these statistics have no bearing on the use of alcohol in therapy. (Jour. A. M. A., April 7, 1923, p. 1007.)

Incompatibility of Mercurochrome-220 Soluble with Local Anesthetics and Alkaloids.—An accident from the precipitation of mercurochrome-220 soluble by procain has been reported. The A. M. A. Chemical Laboratory has confirmed the incompatibility. The following local anesthetics were found to give precipitates when treated with mercurochrome-220 soluble solution: alypin, apothesin, benzocain, butyn, cocain hydrochlorid, Beaucain lactate, phenacain, procain, propaesin, quinin and urea hydrochlorid, tropacocain hydrochlorid and stovain. Many vegetable alkaloids were also found to be incompatible with mercurochrome-220 soluble. (Jour A. M. A., April 14, 1923, p. 1091.)

A Rapidly Eliminated Digitalis Body.—At the request of the Council on Pharmacy and Chemistry, Dr. R. A. Hatcher undertook to elaborate a digitalis preparation that would be stable, that would contain a definite amount of the readily absorbable principle, and that would be suitable, if possible, for intravenous administration. As a result of his work he has isolated a digitalis body which behaves unlike any constituent of digitalis heretofore described. A nearly fatal dose is eliminated within a few hours after its introduction into a cat. It remains to demonstrate the therapeutic value of this new digitalis preparation through the co-operation of the clinician and the pharmacologist. The intravenous administration of digitalis is rarely necessary if digitalis is properly given by mouth. For rare cases in which intravenous medication administration is indicated, it appears that Dr. Hatcher has prepared a drug whose action is less persitsent than other digitalis preparations now available, and which is simply and inexpensively prepared. (Jour. A. M. A., April 14, 1923, p. 1072.)

Glyco-Pepto Milk Not Admitted to N. N. R.—The Council on Pharmacy and Chemistry reports that Glyco-Pepto

Milk is a sour milk said to contain Bacillus bulgaricus, Streptococcus lacticus and Glycobacter peptolytious. The preparation is marketed by the Glyco-Pepto Manufacturing Co., Long Island City, N. Y., with the claim that its administration, supplemented with a potato diet, through the presence of Glycobacter peptolyticus permits the implantation of the Bulgarian bacillus in the lower intestine and thus brings about an almost complete disappearance of phenols and indoxyl from the urine. The Council reports that Glyco-Pepto Milk may be a pleasing beverage and light food, but that there is no acceptable evidence for the many therapeutic claims that are made for it. The Council declared the preparation inadmissible to New and Nonofficial Remedies. (Jour. A. M. A., April 21, 1923, p. 1165.)

Nephritin (Reed and Carnrick) was reported on by the Council on Pharmacy and Chemistry in 1907. The following is a summary of this report: The advertising claims for Nephritin are based on the theory that certain granules in the renal cells, called "grains of segregation," and claimed to have been observed microscopically, carry on the secretion of urinary constituents and that a deficiency of them is the cause of nephritis. While Renaut, who formulated the theory, recommended as a cure for nephritis the maceration of fresh kidneys in physiologic sodium chlorid solution, Reed and Carnrick urged objection to the maceration and explained that nephritin represents all the action of the maceration, but is fifty times as potent. Nephritin is stated to be "the grains of segregation from the cortex of the pig's kidney, the renal connective tissue being eliminated." It appeared impossible that the microscopic structures claimed to be present in nephritin could be isolated as such from the connective tissues, and, on inquiry by the Council, no information on this point was to be had. Further, the firm presented no evidence for the claimed action of nephritin or for the claim that it was fifty times stronger than the maceration. (Jour. A. M. A., April 21, 1923, p. 1167.)

The Treatment of Syphilis.—The general view is that neither mercury or arsphenamin positively cures in cases in which the disease has existed long enough to become well established as a systemic disease, but that they both tend to cure and that both are valuable in treatment. It is the general opinion of syphilologists that when chancres are seen that are unmistakable, these cases should be vigorously treated and that there is a good chance of aborting the disease at this time. If early cases are not treated until the Wassermann reaction has become positive, there is a difference of opinion as to treatment. There are syphilologists who believe that these early cases are better treated by mercury alone until the patient has had an opportunity to develop all the immunity of which he is capable. After the patient has established all the resistance of which he is capable, these syphilologists would treat with mercury and arsphenamin. It is becoming increasingly apparent that the advantages of the new method of treating syphilis, in which arsphenamin plays the larger part, are by no means certain. The trend of the last few years has been in the direction of placing more reliance on mercury and the older methods in the treatment of syphilis. (Jour. A. M. A., April 21, 1923, p. 1167.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of April 11, 1923

Dr. H. Longstreet Taylor, Presiding

Dr. A. R. Hall reported a case of a long remission in pernicious anemia.

Mr. C. T. S. was seen by me in the early part of 1909. He showed a marked anemia with red cells, at one time as low as 700,000 and a hemoglobin of 20 per cent. There was marked variation in the shape of the cells, in the size of the cells, and in their staining properties. He had a total absence of free hydrochloric acid but his nervous system was apparently normal. He was ill, in all, for about eleven months, but gradually improved and then appeared to be quite well until the latter part of November, 1921. During this time, in August, 1917, he again came to me and his blood was apparently normal.

He came under the care of Dr. W. R. McCarthy in November, 1921, at which time he complained of being very sensitive to cold and of numbness in his hands and feet. His blood was examined and the red cells found to be 2,560,000 and the hemoglobin 49 per cent, but later the count was 3,180,000 with a hemoglobin of 69 per cent. There was at this time nothing in the red cells suggestive of primary anemia, but later they dropped as low as 810,000 with a hemoglobin of 18 per cent and white cells 1,600 in number. There was also a marked variation in the size and shape of the red cells and of their staining properties, and both normoblasts and megaloblasts were present. He had from time to time disturbances of digestion, but his gastric contents were not examined. He continued to have numbness in his hands and feet and there was great diminution of the vibration sense in both feet and a loss of sense of position.

I saw him with Dr. McCarthy in March, 1923. There appeared then to be no doubt that he had pernicious anemia. He died on April 8, 1923.

The autopsy, as performed by Dr. Warwick on April 9, 1923, showed a well-developed, fairly well-nourished body. The muscle was unusually bright red in color and the subcutaneous fat, which was small in amount, was a very distinct bright yellow in color. The organs of the chest appeared entirely normal except for a slight hypostatic congestion in the lower lobes of both lungs. The spleen was about twice the normal size and showed a small amount of lymphoid hyperplasia and marked congestion. The liver was also definitely enlarged and very pale in color and greasy upon the cut surface. The microscopic section showed a very large amount of fat, arranged in a diffuse manner throughout. The stomach was very small in size, evidently due to a contraction of the wall, which appeared normal upon microscopic section. The kidneys and bladder and intestines appeared entirely normal. The bone marrow of the femur was a bright red in color and very soft in consistency. The spinal cord was not examined.

I think there is no doubt that this man died of pernicious

anemia and I feel that the anemia of 1909 was also a pernicious anemia; this would make a remission of 12 years.

I wish to thank Dr. McCarthy for permission to report this case.

DISCUSSION

DR. HAMMES: I had an opportunity to observe this case over a period of a year. As I recall, he had definite neurological findings in 1909, manifesting themselves mainly in definite subjective disturbances—numbness in the hands and feet, etc. There was marked improvement not only in his blood picture but also in these neurological symptoms which disappeared entirely. When he had a recurrence of his trouble thirteen years later, his first symptoms were neurologic, sensory disturbances, slight bladder involvement and slight reflex changes, while the red count was normal and the hemoglobin was 80 per cent. As his spinal cord picture became more pronounced, his blood picture gradually took on the characteristics of a pernicious anemia.

DR. HALL: I think Dr. Hammes took the spinal fluid for examination.

DR. HAMMES: The spinal fluid was negative in every way.

DR. E. M. HAMMES reported on the Nonne-Froin spinal fluid syndrome and showed a specimen of spinal fluid.

The specimen which I have to present is a spinal fluid taken from a patient seen in consultation with Dr. Lerche. The patient presented atypical symptoms of a spinal cord tumor suggestive of a cauda equina localization. The color of this spinal fluid was decidedly yellowish and there was spontaneous coagulation. This coagulum developed within less than two minutes after the lumbar puncture. There was an excessive globulin; six lymphocytes; a negative Wassermann, and a colloidal gold curve 1112332200. The pressure of the spinal fluid was so low that it took us six minutes to obtain 4 c.c. I wanted to perform a cisterna puncture in order to have an opportunity to compare the fluid higher up, but we were not permitted to do so. In all probability the fluid would have been normal in every respect.

This syndrome of xanthochromia, with or without a high cell count and with or without spontaneous coagulation, is referred to as a Nonne-Froin syndrome and it simply signifies that the lower portion of the spinal canal has been occluded so as to form a cul-de-sac. One frequently sees this in spinal cord tumors. I recall one patient where this was present in a case of transverse myelitis secondary to Pott's disease.

DISCUSSION

DR. RIGGS: Twenty years ago Froin reported a number of cases in which there was pressure upon the spinal cord, chiefly due to meningitis. He described the syndrome, a specimen of which Dr. Hammes has just shown us.

Thirteen years ago, Nonne described certain cases of pressure on the spinal cord where they did not have any change in color of the spinal fluid, no clotting, no increase in cells, but only a moderate or marked increase in the protein exudate.

Seven years ago, Drs. Ayer and Viets went all over this subject, having in view this work of Froin, as well as that of Nonne, and their conclusions were that the syndromes of Froin and Nonne are characteristic of spinal cord compression. That of Froin is indicative of a marked or rapidly progressive compression; that of Nonne suggests a lesser degree of pressure and is so delicate a test that in cases where cord pressure is in doubt it may be regarded as the most significant obtainable symptom.

DR. FARR: Dr. Riggs referred to the work of Dr. Ayer of Boston. I thought it might be interesting to report some of the recent work he has done in this line—what he calls the "two-needle method," introducing a needle above and one below the suspected point of the lesion. There are definite results in case the fluid above does not mix with that below. These are shown by the pulsation wave as demonstrated by the fluid spurting out, the difference in the rate of flow. I saw Dr. Ayer demonstrate this in a patient and also on a manikin he devised for that purpose. In their hands it has worked out as one of the most perfect methods of locating lesions which entirely cut off the circulation of the spinal fluid in the canal or greatly reduce it.

DR. HAMMES, in closing: The Nonne-Froin syndrome in this patient is of particular interest because the patient presents no evidence of a transverse myelitis. The only symptoms present are some atrophy of the right quadriceps muscles and neuralgic pains in the right anterior crural nerve. Dr. Lerche will probably operate this patient within a few days for a tumor of the cauda equina.

DR. A. E. BENJAMIN reported a case of carcinoma of the pyloric end of the stomach and diverticula of the jejunum.

Mrs. F. S., age 63 years, housewife. Family history negative. Personal history: married 30 years. Three children. Menopause at 45 years. Asthma for last five or six years until last November. Otherwise in fairly good health until last fall.

Present Illness: After asthma disappeared she began having pain in the gastric area, nausea and vomiting. Pain came on about one hour after eating. Symptoms gradually became worse and patient was unable to take any foods without vomiting, for three or four weeks. Bowels were very loose at times. Considerable swelling of both limbs. Patient emaciated and weak.

Physical examination disclosed a movable mass at the pyloric end of the stomach about the size of a small orange.

Laboratory findings: Temperature, 98; pulse, 84; hgb., 80; blood-pressure, 94/60. Urine—orange, clear, acid, 1036; alb., 0; sugar, 0.

X-ray showed annular constriction at the pylorus, probably carcinoma.

Operation: Local anesthetic, median incision. About 20 ounces of free fluid in the abdominal cavity. Three diverticula of the jejunum were found about one-half the size of the lumen of the gut, 12 to 20 inches from the duodenum. The mass involved the pylorus and one-fourth of the pyloric end of the stomach. Many of the mesentery glands were enlarged. A posterior gastroenterostomy seemed impractical in this case and to relieve the incessant vomiting an anterior gastroenterostomy was performed.

Comment: The patient did well for three days, but lavage had to be performed at the end of the third day. Patient gradually became weaker, the bowels being loose for three days. She died suddenly on the fifth day after operation. A post-mortem was not obtained in this case, but being in a very weakened condition, she probably died from

exhaustion. There was no apparent peritonitis or distention of the abdomen. The interesting points in connection with this case are:

1. The diverticula of the jejunum.
2. The rapidity of the development of the growth and the symptoms.
3. The unusually good laboratory findings.
4. The unexpected and rapid termination of the case.

DISCUSSION

DR. SCHWYZER: Sometimes these operations on the stomach will run a course like that. When I heard this report I remembered a case where we made a sub-total excision of the stomach. We had gone up to the diaphragm, which left only a little bit of stomach that we could make a gastroenterostomy on. That is very risky. In Dr. Benjamin's case there was no marked interference with the circulation of the stomach. The case of mine did well for a week, was happy, had a pretty good pulse and normal temperature. At the end of about seven days the pulse rapidly went up and he died. We made an autopsy. When you have to go beyond the gastric artery and then do much suturing you are liable to have a necrosis following. At autopsy there was no recognizable peritonitis, no fluid in the abdomen, but there was necrosis of the anterior wall of the stomach. There may be marked pathology without many outward symptoms.

DR. FARR: About three years ago I did an extensive gastrectomy and I turned back a flap of the ribs in order to reach the cardiac end of the stomach. I ligated the gastric artery. That patient went through a perfectly normal convalescence until the 9th day. Pulse became rapid. Patient became weak and died two days after the onset of these symptoms.

Autopsy showed a necrotic mass about the size of a dollar with a small leak in it.

DR. BENJAMIN, in closing: I am very glad to have this explanation given. I recall another case I operated about fifteen years ago, where the same thing happened apparently. I was not able to obtain an autopsy. In that case necrosis might have occurred, but in this case it did not seem to be so. Gastroenterostomy now seems to be a rather simple procedure and good results are usually obtained.

DR. R. E. FARR gave a supplementary report on the case of removal of larynx (reported at March meeting).

I would like to add a supplementary report on the pathological examination of the case of the larynx that I reported at our last meeting.

The microscopic report furnished by Dr. Bell shows that the ulcer was not malignant, was not luetic, and not tuberculous; therefore, only chronic inflammation.

This brings up the important question of what should have been done in the case. There is not a great deal written about it. Going back, the question of resecting the larynx without frozen section must be considered. The larynx was involved to a little over one-half its surface—an area about as large as a dollar and 1 cm. deep. Had frozen sections been made of such a case while the patient was on the table, and had shown no malignancy, should one close the larynx and leave it alone? If not, should one cauterize it, and let it go? This man had had the trouble for three years. The fact that frozen sections show no malignancy and serial sections later show malignancy had to be considered. Less than one-third of the circumference of the larynx would remain after resection. If one removed three-fourths of the larynx the patient could not get along because the larynx would not remain patulous. As nearly as I can see from the literature, I cannot change my opinion as to what should have been done in this case.

DR. C. EUGENE RIGGS read a paper entitled "The Disappearance of Headache and the Hemi-Parkinson Syndrome in a case of Encephalitis Lethargica following the Intravenous Injection of Sodium Iodide."

DISCUSSION

DR. HAMMES: Dr. Riggs is to be congratulated not only on having so clearly pointed out the many phases of this most interesting subject but especially because of having stressed the importance of sodium iodide intravenously in this condition. In our work, we have tried every form of treatment that has been commended in the literature excepting Rosenow's serum, and have secured better results from the intravenous use of sodium iodide after the subsidence of the acute stage than in any other form of therapy.

The causative factor in this condition is still in doubt, although some workers (Loewe and Straus and others) have discovered a filtrable organism which has a definite effect when introduced into rabbits, producing somewhat atypical symptoms of encephalitis. This organism closely resembles Flexner's streptodiplococcus, which he found in poliomyelitis. However, it differs from Flexner's organism in that it is more virulent to rabbits and much less virulent to monkeys and the immunizing serum against Flexner's poliomyelitis organism has no protective influence over the organism reported in encephalitis cases.

DR. CROSS: Dr. Riggs has impressed us authoritatively with the seriousness of the epidemic we are now experiencing. His paper is a very timely contribution to what seems like a maze to most of us.

If it is fair to ask, I would like to know what led to the employment of sodium iodide in the treatment of encephalitis. Has it been used to mitigate the pain only, or has it been found of value in shortening the disease?

We are all wondering at present whether there is any time when one may consider that the patient is out of danger. Many patients who have had undoubted encephalitis apparently convalesce, and are anxious to take up activity. Under what conditions is it safe to allow the patient to exercise, or how long—if it has been determined—should a patient remain at rest after the attack, until the danger of a development of later trouble is past? We have all noticed that the period of prostration or lack of endurance is a very variable one in different patients.

DR. FARR: Looking at this subject from the standpoint of one who knows very little about neurology and still sees these patients, I think I might call attention to some surgical phases of this disease which have threatened in a number of instances to get me into trouble.

Something over a year ago I received a wire from a doctor at Brainerd saying he was bringing a patient in with acute intestinal obstruction. This man came in with a greatly distended abdomen, terrific pain, bowels had not acted for three days, but he lacked abdominal rigidity. A

routine examination failed to bear out a diagnosis of intestinal obstruction but brought out some mental symptoms. I asked Dr. Gardner and Dr. Hamilton to see him. He shortly developed acute mania, became lethargic, and finally recovered.

Within the last few months Dr. LaPierre sent a case to the hospital as one of intestinal obstruction. Again I hesitated because the abdominal symptoms were not complete, and in making a neurological examination I was impressed with the fact that his mentality was off. I hesitated long enough to have a spinal puncture and other investigations made and Dr. Hamilton saw this case, too. We waited two or three days so that we could get all the laboratory data for him, and this case turned out to be lethargic encephalitis.

I operated on a woman for sub-acute appendicitis. She was very hysterical and still she seemed to be definitely an operative case. She had a large, thickened, reddened appendix, and I felt that we were all right. She went home two weeks ago and within the last two days developed foot-drop and other things which rather took the wind out of my sails.

We have about reached the conclusion that all suspicious cases that come in to us, that is, all cases that are not definitely things that we can nail down as entities, we call encephalitis until they are proven otherwise.

DR. RIGGS, in closing: Souques' conception of paralysis agitans was very illuminating to me. It was original and certainly very modern. According to this you have in the region of the substantia nigra irritation of a variety of kinds. It is a syndrome, not a disease. Then came the findings of Goldstein, Foix, and McKinley and others who investigated these encephalitic cases with the Parkinson syndrome. Foix found in this region "active inflammator, processes." It was that that suggested to me the use of the iodide of sodium. I don't know how to answer your question better than to say that it was the supposed alterative property of iodide and its solvent effect on sub-acute inflammatory processes that prompted me to use it.

I also want to emphasize here that if Souques is correct, and that if encephalitis with its lesions in this area has helped us to arrive at a definite idea of what essential paralysis agitans is, it has accomplished much. In my own mind, I decided that whenever I got a clear-cut case of paralysis agitans I was going to try the administration of sodium iodide.

I don't know how better to express my feeling with regard to the uncertainty of recovery from encephalitis than I did in my closing sentence: "A seeming convalescence may only be an illusion of hope; an apparent recovery a fool's paradise." We have a latent chronic infection resembling the "para" stage of syphilis. How long that will remain in the system without some sudden outbreak, as so often occurs, no one knows.

I was greatly interested in Dr. Farr's remarks and I think that his observations are a real contribution to the subject. It confirms my statement that it is a masquerader like hysteria; it simulates everything and anything in the way of morbid manifestations.

I might say that we have been using a preparation put up by Upjohn in ampules, 31 grains of sodium iodide to the ampule and all ready to use. I think the preparations are made by three good pharmaceutical firms. The frequency of use simply depends upon the reaction you get. We use it from one to three times a week, according to indications.

It seems to me, gentlemen, that it is a real advance in therapy. It does relieve headache, and that is something.

DR. NOOTNAGEL: Do you perform the spinal puncture at the same time?

DR. RIGGS: It does not always give headache, but if it does, we do so. Dr. Hammes had one case in which there occurred severe headache; a lumbar puncture about 8 hours afterwards gave immediate relief.

DR. BENJAMIN: How much do you withdraw?

DR. HAMMES: As much as you comfortably can.

DR. CROSS: Do I understand that the findings which led you to use sodium iodide was in paralysis agitans and not encephalitis?

DR. RIGGS: It was in the Parkinsonian syndrome of encephalitis.

DR. HAMMES: Every brain that has been examined has shown definite changes. The peripheral nerves show definite degeneration.

DR. RIGGS: One question that I think was suggested by Dr. Cross; as to the time of the use of the iodide. We have used it only in the chronic stages of the disease; never in the acute stage. I can't help but feel that there is a real indication for the use of the hypertonic salt solution in the acute stage.

DR. CARLAW: Are your initial dose and the other doses of the same size?

DR. RIGGS: All the same size.

DR. HAMMES: I suppose one could use it in increasing doses, but we have not done so.

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

Stated Meeting Held October 5, 1922
THE PRESIDENT, DR. ROSCOE B. WEBB, in the Chair

OPERATIVE FINDINGS IN AN INGUINAL HERNIA PREVIOUSLY INJECTED WITH PARAFFIN

DR. KENNETH BULKLEY presented an adult male, aged 50, who was admitted to the Northwestern Hospital on March 11, 1922, with the following history:

About six years ago this man developed a left inguinal hernia. Four years ago he consulted an Institute in Des Moines which specializes in the paraffin injection treatment of hernias. This man stated that he went into this office, the skin of the inguinal region was anesthetized and then with a large syringe and a needle about four inches in length, approximately four ounces of hot paraffin was injected and manipulated into place by the operator. He remained in the office for a period of about an hour, following which he went home. About two months ago this patient had a right inguinal hernia treated in a similar manner. Four days before his admission to the hospital a mass appeared in the left groin which was painful and

which the patient was unable to reduce. His bowels moved on the day of his admission to the hospital following the taking of a cathartic. He has had no urinary symptoms. He has been nauseated for two days, but has not vomited.

Examination showed in the left inguinal region a mass extending the length of the canal, but not protruding through the external ring. This mass was dull to percussion, tender, could not be reduced and presented the typical appearance of a strangulated epiplocele. No hernia could be detected on the right side.

Under gas-ether anesthesia, under the impression that a strangulated inguinal hernia was being operated upon, an oblique incision was made and there was encountered almost immediately a mass of semi-solid paraffin bathed in a rather thick, odorless pus. The surrounding structures were hard and indurated so that the anatomy of the region could not be determined. This abscess cavity contained large quantities of semi-solid paraffin and pus extending directly posterior over the body of the pubis and down into the true pelvis to a depth of four inches. No hernia at any time was detected nor was any sought. A rubber drainage tube was placed to the deepest portion of the wound and the wound partially closed.

This man made a normal convalescence without complications, his temperature promptly dropping to normal and there remaining. For a period, however, of nearly three months this man extruded from his wound small bits of paraffin. For the past six weeks his wound has been healed. He is presented tonight as an instance of a double, inguinal hernia apparently cured by paraffin injection. At the present time no hernia can be detected in either inguinal region.

Dr. James M. Hayes said he had seen about six or eight cases of inguinal hernia which had had paraffin injections, but this was the first case which he had seen in which a cure had been effected. Two cases who claimed to have been injected had no signs of paraffin remaining at the time of operation, while a third presented a well circumscribed mass, presenting much the same appearance as that of a "paraffinola." The remaining cases he did not see go to operation, but externally could not say that the injection produced any change.

Dr. Roscoe B. Webb recalled a patient who had a large right inguinal hernia who was treated sometime after in a neighboring state. Examination later revealed no evidence of hernia. There was a large mass of paraffin about one and one-half inches in diameter just within the external ring. No recurrence as yet.

Stated Meeting Held December 7, 1922
The President, Dr. R. C. Webb, in the Chair

Dr. George R. Dunn read a paper on The Obliteration of Bone Cavities in Chronic Osteomyelitis by Free Fat Transplantation. (See page 379.)

ACUTE INTESTINAL OBSTRUCTION AND RUPTURED APPENDIX FROM ADHESIONS

Dr. Archa E. Wilcox presented a schoolboy, aged 12, who was admitted to the General Hospital on September 16, 1922, with the following history:

Eight days previous patient noticed pain in the abdomen in the region of the umbilicus, which came on suddenly at 9 P. M. Next day he felt feverish, had continued pain around umbilicus and was nauseated. That evening he vomited three times. Next day the patient had diarrhea, with bowel movements about every hour. Pain persisted about umbilicus, but would let up at times and be severe at other times. Patient seemed to have pain every few minutes, which would cause him to cry out. Vomiting occurred several times. Next day patient still had pain about umbilicus, diarrhea was more severe and no food was taken. For the next three days condition was the same, when pain shifted to left lower quadrant, but continued to come on every few minutes. No bowel movements except by enema. Stools have been green and watery, no blood. Patient has eaten practically no food for past week, but has been getting medicine by mouth, which stopped diarrhea. Was given injection in arm two days ago, but pain was not relieved. No history of any previous attacks of abdominal pain. Patient has vomited occasionally at times in past associated with eating of food which did not agree. Never sick at these times.

Past History: Child has been in good health all his life.

Examination: Fairly well developed and nourished boy. Has somewhat anxious facial expression and complains of pain in left side of abdomen. Slight desquamation present over forehead. Pupils equal and regular, and react to light. Head, eyes, ears, nose, mouth and throat negative. Chest and lungs negative. Lung border pushed up by tympanitic abdomen. Heart negative.

Slight distention of abdomen present. Slight discoloration present about umbilicus. Some tenderness of whole abdomen, more markedly tender over an area on left side about two inches to left of umbilicus. Slight rigidity present. Tympanitic note throughout chiefly over upper portion. Liver dullness partially obliterated. Tympanitic note high up on left side anteriorly.

Rectal examination showed some tenderness, no mass, and no localized palpable tender point.

Sept. 16, 1922: 11:30 P. M. Patient admitted to hospital with pain in abdomen, more on left side. Leucocytes 13,500 (86 per cent polymorphonuclears, 14 per cent lymphocytes). Abdomen considerably distended. Patient having pains which come on every few minutes, causing patient to cry out. Slight muscle spasm and rigidity over left upper abdomen. Tenderness on palpation over entire abdomen, more marked on left side. Patient has normal temperature. Pulse 104. Noble's enema given. Considerable amount of greenish black liquid excreted. Morph. sulph. gr. 1/12 given for relief of pain.

Sept. 17, 1922: Whole abdomen tympanitic. Tenderness on left side of abdomen. Enema relieved distention. Somewhat greenish brown material passed. Pain practically gone. Passed one bloody stool, moderate in quantity.

Operation, Sept. 18, 1922: Local and gas anesthesia. Lower mid-line incision. Bowels found adherent to parietal peritoneum. One loop of small bowel found collapsed, but it filled easily from either end on manipulation. A ruptured appendix found. Appendix removed. Pus had ruptured through the mesentery and was exuding on the left side of spine. As much of the pus as possible was sponged

out. Two large cigarette drains were inserted, one in the region of the appendix and the other on the left side of the spine, where pus was exuding. The wound was closed with plain catgut and three through-and-through silkworms. Dermal used in skin.

Patient given 400 c.c. saline intravenously and 1000 c.c. by hypodermoclysis immediately. Enteroclysis started. Morphine p.r.n.

Sept. 19, 1922: Patient had fairly comfortable night. Pulse up, but of good quality. Dressings changed soaked with sanguino-purulent discharge.

Sept. 20, 1922: Patient fairly comfortable. Given hypodermic in night. Pulse still elevated, 130. Some distention present, partially relieved by modified Noble's enema.

The patient continued to remain about the same, having considerable gas pains, until October 27, 1922, when the pain disappeared, abdominal distention occurred, patient became anxious, vomiting occurred and a diagnosis of obstruction was made.

Oct. 28, 1922: Still much pain. Enema only slightly effectual. Stomach washed out.

Operation, Oct. 29, 1922: Abdomen opened through left rectus muscle. Numerous adhesions were seen in left upper quadrant caused by previous operation. These adhesions were evidently plastic, fibrous affairs and showed some evidence of hemorrhaging in the adhesions. All that could be found were freed and the collapsed bowel was easily inflated. There was one portion of the ileum that appeared to be approaching the gangrenous state, but upon freeing the adhesions the color came back sufficiently to warrant leaving it alone. The adhesions around the appendix operative field were not disturbed. Abdomen closed without drainage. Stomach washed out and 2 ounces of castor oil were passed into the stomach through tube. Wound closed with chromic catgut and reinforced with chromic.

Following the second operation convalescence was extremely stormy. There was a great amount of discharge from the abdominal wound and sloughing away of nearly all the rectus muscle, but when granulation did develop it was remarkable how the abdominal wall healed, and upon patient's discharge in January, 1923, no abdominal distress was present, functions were normal and there had been considerable gain in weight.

RUPTURED KIDNEY

Dr. Frederick H. Poppe then presented a child, female, aged 11, who fell September last, tripping over a boy's foot and striking her left lumbar region on the edge of the house steps. She immediately fell to the ground complaining of severe pain in the left lumbar and hip regions, telling her mother that she felt "terribly bad." She was carried into the house still complaining of pain. One-half hour later she vomited and was pale, her skin was moist, her pulse rapid, her respiration shallow and she still complained of pain.

Examination revealed slight rigidity of muscles over the left hypochondriac region, only elicited by deep palpation, and marked muscular spasm over the lumbar region posteriorly. There was no tenderness in the region of the left hip. Patient had not urinated for several hours so was asked to void. She voided 6-7 ounces of bloody urine.

From the bloody urine, shock, localized areas of tenderness and type of accident, a diagnosis of a ruptured kidney was made. Immediate exploration was advised.

Exploration through an oblique incision in the lumbar region revealed a kidney with lower pole (lower third) amputated except for capsular hinge near hilum and marked bleeding from both surfaces. It was decided that the easiest and most efficient way to control the hemorrhage would be to stitch amputated portion back in original position. This was done with four mattress sutures of fine catgut and the wound closed with drainage.

Subsequent events confirmed the diagnosis. Twelve hours after operation centrifuged urine was negative for blood, and drainage was also nil. Drains removed in 3 days. Patient made an uneventful and complete recovery.

The mechanics of this particular injury seemed to be the 12th rib swinging forward as a scythe, fulcrum at spine, amputating projecting portion of kidney.

Dr. Poppe stated it was interesting to note that Delbet and Watson, in a report of these cases, found that two-thirds recovered without operation; where it was necessary to perform a nephrectomy, three-fourths recovered; and only 5 per cent of these cases died following exploratory operation. In other words, out of two series of 225 and 273, 45 per cent and 30 per cent, respectively, died without operation, but out of two series of 50 and 99, only 4 per cent and 7 per cent, respectively, died after exploratory operation. Needless to say, in children the worst cases were usually encountered and the highest mortality rate ensued.

It behooves us, once the diagnosis is made, to immediately explore and undo damage wrought as efficiently as we are able.

The paper of the evening entitled Meckel's Diverticulum as an Etiological Factor in Intestinal Obstruction was presented by Dr. James A. Johnson, Minneapolis.

DISCUSSION

Dr. James M. Hayes: I want to congratulate Dr. Johnson on his complete and excellent discussion of Meckel's diverticulum as a cause of intestinal obstruction. Very little remains to be said on this phase of obstruction. The prime factor, of course, in every intestinal obstruction is to make a diagnosis of obstruction. The more readily it is made, the greater are the patient's chances. Frequently a mass can be palpated which gives us quite a definite clue to the location of the obstruction. There are some other features which might aid us in determining the form and location of the obstruction.

Because of the presence of the pancreatic and duodenal ferments in the upper small intestine, an obstruction here is more rapidly fatal than in the lower small intestine. The period in which we may obtain surgical relief from obstruction in the large intestine is greater than that when the obstruction is in the small intestine.

The average age at which Meckel's diverticulum produces obstruction, as Dr. Johnson has stated, is about twenty-one years. Usually obstruction in the large intestine comes on at a more advanced age, usually in the cancer age.

Tetany may accompany an obstruction in the duodenum or upper jejunum. The vomitus is usually watery at first and later has the appearance of bile, with little odor. In

the lower small intestine the vomitus soon takes on a fecal character with very foul odor.

DR. ARTHUR F. BRATRUD: The subject of intestinal obstruction is always a most timely one because of the great difficulty in making a diagnosis when these cases are first seen and the high mortality rate present even after diagnosis is made. Dr. Johnson has covered the field so thoroughly from the embryological point of view and the various methods by which an obstruction could be caused that nothing more could be said.

It is doubtful whether a diagnosis of Meckel's diverticulum is ever made pre-operatively, yet, where a strangulation or obstruction is suspected, the most important diagnostic symptom is severe, colicky pain with frequently running paroxysms, non-localized, associated with nausea and vomiting. As a rule there is absence of stools and absence of tenderness and rigidity. A point which may be of value in diagnosis is history in regard to discharge from the umbilicus, which may vary from a serous to a purulent discharge. Even though a provisional diagnosis of intestinal obstruction is made, I do believe it is of value to give a liberal dose of charcoal, for if charcoal is recovered in the stools, we know there is not a complete obstruction. While as a rule a diverticulum of the small intestine gives no discomfort, because of the free exit of the contents, yet there are cases which do produce symptoms simulating attacks of appendicitis as well as attacks of gallstones (as illustrated by a case reported by Dean Lewis). The possibility that a diverticulum may cause trouble depends on several factors. First, they often tend to enlarge from the pressure within. Also, they tend to harbor fecal and other harmful contents, and probably most important is the fact that they undergo various secondary pathologic changes, amongst which may be mentioned: infection, adhesions, perforation as sometimes occurs in a hernial sac, chronic proliferative inflammation with subsequent thickening of the intestinal wall and stenosis of the bowel, and the conditions stated by the essayist.

I believe that every case operated on for any abdominal condition should be examined for Meckel's diverticulum. It requires but little time and vague abdominal conditions may be cleared up by proper care of this pathological condition.

The question of anesthesia in this condition is important. In every obstruction it is the absorption of toxic material above the point of obstruction that causes death. Either local or spinal anesthesia should be used if possible. Of these two, spinal is best, for with it there is a paralysis of the plexuses of Auerbach and Meissner which control the inhibitory fibers of peristalsis. As a result, there is evacuation and emptying of the bowel of the toxic material oftentimes before the operation is completed.

DR. FREDERICK OLSON: The essayist has to my knowledge been interested in this subject for several years. A large amount of information has been boiled down into a concise presentation. Dr. Johnson and the Society are to be congratulated on the paper. Reiteration and accentuation of any point making for better diagnosis in the "acute abdomen" cannot be too highly commended.

DR. O. W. YOERG: I think Dr. Johnson's paper is of unusual interest. I believe very few surgeons have had the opportunity of operating three cases of this type of obstruction. No doubt this cause of obstruction is occasionally overlooked. Dr. Johnson is to be congratulated in his early diagnosis and successful handling of these cases.

DR. JOHNSON (closing): I am very pleased to have had so many members discuss my paper. It has been a very interesting subject to me while I have been working on it, especially to find that there are such a great number of intestinal obstructions that are overlooked which are due to Meckel's diverticulum. They may develop into a stage where operation is of very little avail; in other words, terminal cases of intestinal obstruction, which of course accounts for the very high mortality reported.

In this connection, I wish to speak of Case 3, the little child who died from intussusception. Every effort was made to rule out intussusception and it was thought that this had been done. I feel now that in the event I have the same type of case present itself to me, I would have no hesitancy in giving such a child a small amount of anesthesia, enough to relax the abdomen so that I could definitely rule out any intussusception. I have never done this, but I am quite certain that next time I shall resort to this particular measure. Perhaps even that will not rule out the early cases, but I believe it may be an additional diagnostic feature.

PROGRESS

Abstracts to be submitted to Section Supervisors.

SURGERY

SUPERVISORS:

E. MENDELSSOHN JONES,
LOWRY BLDG., ST. PAUL

VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

DOUBLE KIDNEY — Daniel N. Eisendrath (Ann. of Surg., April, 1923): There is much confusion in nomenclature of renal anomalies.

In cases in which both kidneys are on the same side crossed ectopia is the best term to use and the lower kidney is the one which is ectopic. The partial fusion or complete fusion in crossed ectopia is the result of a displacement of one kidney during embryonic life.

Where a regular kidney has formed over the cranial ends of two ureters which arise from the same ureteral bud, the condition is best referred to as double kidney.

Horseshoe kidney exists in variable degree from cases in which they are connected by a narrow band of fibrous tissue to cases in which there is a single mass with no apparent division or constriction. The two halves never lie on the same side of the spine.

Supernumerary kidney means a third complete kidney with no connection with either of the other two kidneys. This is a very rare condition.

Young, Davis, nor the author could find a case of two ureters with one renal pelvis. There is no recorded case in

which there was a reduplication of the ureters and a union at some higher point so as to end in a single pelvis.

The frequency of double kidney and likewise reduplication of pelves and ureters averages between 3 and 4 per cent.

From large reported series of cases there were 619 reduplications of ureters and renal pelves.

1. Condition found on one side in 80 per cent (502 cases).
   Condition found on both sides in 20 per cent.
2. Of the unilateral cases the reduplication was complete in 156 (50 per cent).
   Of the unilateral cases the reduplication was incomplete in 346 (70 per cent).
3. Of the bilateral cases there was complete reduplication in 80 per cent.
   Of the bilateral cases there was incomplete reduplication in 20 per cent.

From the clinical and pathological standpoint, we are interested in many features of reduplication of the renal pelvis and ureter. For the sake of simplicity one may divide these into those relating to the kidney itself and into those relating to the ureter.

A. Kidney
   1. Different degree of separation of two halves.
   2. Relative size of two halves.
   3. Association with other renal anomalies.
   Double kidney usually lies a little lower than normal.

B. Ureter
   1. Relation of the two ureters to each other at upper end and to the renal pelvis (important from surgical standpoint).
   2. Level of union, mode of crossing and of normal ending of ureters. In the bladder the lower and mesial orifice always belong to the ureter from the upper half of the kidney.

C. Ectopic or abnormal mode of ending of ureters
   1. Open endings into male genito-urinary tract
      (a) Into bladder (usually near neck)
      (b) Into urethra
      (c) Into seminal vesicle, ejaculatory duct and vas deferens
   2. Open endings into female genito-urinary tract
      (a) Into urethra
      (b) Into vagina
      (c) Into vestibulum vaginæ
      (d) Into persisting duct of Gärtner
   3. Blind openings
      (a) Into muscular layer of bladder
      (b) Into submucous layer of posterior wall of floor of bladder
      (c) Into cystic dilatation
      (d) Into submucous tissue of vagina or vestibule.
      (May be cause of incontinence in females)

D. Associated defects of the male and female genitalia.

W. P. HERBST.

SLIDING HERNIAS OF THE CECUM AND APPENDIX IN CHILDREN—Vernon C. David (Ann. of Surg., April, 1923): Real sliding hernias are rarely seen in children. Coley, in 2,200 hernias, found cecum alone in sac in 18, appendix alone in 10, and cecum and appendix together in 7. Judd, in 1,652 hernias, found 14 of the sliding type, 6 of which were of the cecum on the right side. Hilgenreiner reports 22 hernias of the cecum in 2,238 hernias operated on, 8 of which were sliding. Hildebrand in 1892 collected 128 cases of hernia of the cecum, of which 80 were right inguinal, 18 left inguinal, and 11 right femoral. In 16 instances cecum was present in the right inguinal hernia in children. Of these, 2 were in the fetus at the eighth month, 2 in children over 9 years, and 12 in children during the first year of life. The appendix was attached to the sac and testes in 3 cases. The ascending colon was adherent to the sac in 2 instances, but the cecum was free in all cases.

The two most discussed factors in the causation of sliding hernia in children are the rotation of the cecum and the descent of the testes during fetal life. Treves states that the cecum remains underneath the liver until the fourth month after birth. The finding of the cecum in the patent vaginal process at the eighth fetal month makes Treves' view doubtful.

Lockwood suggests that the cecum is pulled into the scrotum by the persistence of a fold he found running from the mesorchium of the testicle along the posterior abdominal wall to end in the cecum, appendix, or mesentery. Most men do not agree with Lockwood's theory because the vaginal process is in the scrotum before the testicle descends. It would seem that a more likely result of an adhesion between the testicle and cecum would be an undescended testicle.

Three explanations of incorporation of bowel as part of the hernial sac are given:

1. Fetal peritonitis (unlikely because there is no other evidence of results of fetal peritonitis).
2. Fusion of peritoneal surface of the cecum which has found its way into the hernial sac to the peritoneum of the vaginal process. (Most likely in author's opinion.)
3. Fusion of peritoneal surface of the cecum to that part of the parietal peritoneum which later will become the vaginal process of peritoneum the sixth or seventh month of fetal life and consequent descent of the cecum into the hernial sac in this way.

Three cases of sliding hernia are given, in all of which the cecum was incorporated in the wall of the sac.

Illustrations of technique are given which consist of:

1. Transverse division of sac between appendix and testicle with immediate closure of testicular portion of sac by purse-string, thus re-establishing the tunica vaginalis testis.
2. Appendix then removed with its sac wall.
3. Sac divided longitudinally having a posterior wall made up of cecum and an anterior wall of peritoneum.
4. The posterior cecal portion is returned to abdomen through the internal ring after it is separated from the cord and its surrounding soft parts up to the internal ring.
5. The anterior peritoneal portion of sac was cut away except enough to imbricate and sew over the posterior wall of the inguinal canal.

V. C. HUNT.

PEDIATRICS

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SOME POINTS ON HEART DISEASE IN CHILDREN—J. Porter Parkinson (Arch. of Ped. Feb., 1923). Inequalities of the pulse are very common and are frequently of no pathological significance at all. Another variety of irregularity of the pulse is extrasystoles which are premature contractions. These extrasystoles often occur in neurotic children, or in those subject to attacks of indigestion, or they may be seen during the convalescence after some acute disease. If the child has no symptoms or signs of heart disease, the mere presence of extrasystoles is of no clinical importance whatsoever and their presence may be ignored.

Bradycardia is not very uncommon during convalescence from some acute disease, such as pneumonia or influenza. Tachycardia, a rapid action of the heart, is a natural consequence of fever, exertion, emotion, etc., but it may occur as a solitary phenomenon in an otherwise apparently healthy child. Syncope is a symptom which the lay public generally attributes to heart disease, but in children this symptom, which is not uncommon, is not associated with any form of cardiac weakness. It is generally of nervous origin and occurs in nervous, debilitated, anemic children or may be due to the stress of school life.

Non-organic murmurs, generally called functional, or accidental or cardiopulmonary, are very frequent in children and are of no importance whatsoever and so it is of the greatest importance that one should know how to recognize them and distinguish them from murmurs due to valvular disease. The cardiopulmonary murmur is usually heard in the region of the apex, but sometimes is to be heard at the base of the heart; it is usually systolic in time but a diastolic murmur may also be present. Pulmonary systolic murmur is a very common murmur in children; it is localized usually in about the 2nd intercostal space close to the sternum. It is usually soft and blowing and is not accompanied by any signs of heart disease, such as dilatation, or by any symptoms. This murmur is of no significance and generally disappears about puberty. Feeble, badly nourished, nervous children often develop a systolic murmur heard at the apex of the heart and probably of mitral origin. The murmur is generally faint and may be absent from time to time. It does not indicate disease of the mitral valve, and treatment should be directed to improving the nutrition and the general health. Organic heart disease appears to be becoming increasingly common in children, and the first point to mention is that valvular disease is often only a small part of the trouble; the condition of the cardiac muscle and the presence or absence of adhesion of the pericardium being of much greater importance.

The greatest importance should be attached to persistent tachycardia in a rheumatic child who has other symptoms and signs of heart disease, and such a child should be kept at rest in bed till the frequency of the heart has lessened along with the dilatation. Dilatation of the heart is a very frequent sign in heart disease in children; it is of the first importance not to mistake displacement of the heart for dilatation. Distinction must be made between acute dilatation, due to failure of the muscle of the heart, and chronic dilatation, which is part of the compensatory mechanism in chronic valvular disease.

The signs of cardiac failure in children differ markedly from those of adult life in that anasarca is not usually present. The amount of urine is also a guide to the progress of a case. At least six months should elapse after carditis before the child may be allowed to take up a normal life, and it is obviously impossible to keep children in hospital for such a long period, the result being that the child is sent home after 6 or 8 weeks of hospital treatment and is allowed to resume its normal life. The results of this, at least among the laboring classes, are disastrous. It seems to the author that if it were possible to institute country homes to which these children could be sent for some months, and guarded from over-exertion, while, if necessary, they might continue their education, we should do much to prevent chronic heart disease.

R. N. ANDREWS.

RICKETS—Eric Pritchard (Arch. of Ped., Feb., 1923): All conditions of malnutrition in infants and young children, arising from any cause whatsoever, whether of bad feeding or mal-hygiene, provided they are severe enough, and long enough continued, must inevitably lead to the condition we call rickets, for the reason that all such conditions conduce to the development of an acidosis, and consequently to mineral depletion and calcium impoverishment, which causes a rickety condition.

A very large number of experiments have been made which prove that in rickets there is no noticeable shortage of calcium in the blood, however great may be its shortage in the body as a whole or in the bones in particular. But this is rather what would be expected, for calcium is such an important and vital constituent of the blood and such an essential element in metabolism that no great reduction of it in the blood itself would be compatible with a continuation of life. If the views of Ylppo, of Michel and Hugoumen and of Hamilton are correct, there is a congenital calcium reserve in the bones of all full-time newly-born babies which can be drawn upon to make good any deficiency of lime which may exist in their food. This fact is offered in explanation of the comparatively rare appearance of rickets in young infants of full term, whereas in premature infants, in whom there is no such reserve, rickets develops frequently and at an early date.

It is clear that in conditions of ill health, in which the physiological output of energy is less than the total value of the potential energy of the food, the output can be equated to the intake and health restored by any expedient or expedients which increase metabolism or the output of physiological work and heat, as, for instance, by the taking of increased exercise or by exposure to increased cold. On the other hand, a condition of equilibrium or bodily health, in which the output and intake are equal, can be disturbed

by any event or events which depress metabolism or restrict the output of energy. Such depressants include high external temperatures, stuffy atmospheres, the limitation of exercise, want of sun, mental depression. It will be noticed that the depressants of metabolism include some of the well-recognized etiological factors which singly or in combination predispose to rickets by interfering with the efficiency of the body as a working machine, and thereby limiting the output of useful work. A diet which is preeminently rachitic can be rendered physiologically correct if, under the existing circumstances, it is possible by appropriate forms of stimulation to make the child display more energy and increase his output of work. On the other hand, an environment which is well designed to produce rickets may be shorn of its immediate dangers if the intake of food can be adjusted to the existing output of energy.

In conclusion, I would point out that all known and recognized etiological factors in rickets are also familiar as etiological factors in the production of an acidosis. Secondly, that all the clinical symptoms of rickets, i.e., the mineral depletion of the tissues, the excessive calcium output, the muscular debility, the nervous irritability, as well as many others, are obviously the result of an acidosis which creates a demand for calcium which is far more urgent and vital than the less essential claims of growing bones or other tissues.

There is no theory of rickets other than this acidosis theory which is capable of explaining all the known etiological, pathological and therapeutical facts connected with the causation and treatment of rickets, and for this reason, if for no other, and by a process of exclusion, one is forced to believe that an acidosis is the true cause of rickets, and that all the factors which are claimed by one or other authority to be causes of rickets are merely remote or contributory factors in the etiology.

R. N. ANDREWS.

THE PATHOGENESIS OF CELIAC DISEASE—Reginald Miller, London (Arch. of Ped., Feb., 1923): Celiac disease shows one essential and constant feature, that is, the failure to absorb properly the fat in the food. It is well known that the classical type of celiac stool, large, pale, unformed and very offensive, contains a great excess of fat which is chiefly in the form of fatty acids. This failure in fat-absorption is accountable for the cardinal symptoms of celiac disease, (1) the characteristic fatty stool, (2) the enlargement of the abdomen without signs of gross abdominal disease, and (3) the retardation of growth and development. It also causes the two other most frequent symptoms, the severe impairment of appetite and the tendency to feverish attacks; for both these are usually controlled by the rigorous diminution of the amount of fat taken in the diet.

It would seem the failure to absorb fat can only be attributed to one or more of three organs—the pancreas, the small intestine or the liver. The author has analyzed many stools and has quite confirmed the opinion that the pancreas is not to blame for the failure in fat absorption in celiac disease. Where the pancreas fails, fat-splitting fails, and this does not happen in celiac disease. Quite a superficial view shows us that we are not dealing merely with an enteritis. In these cases we do not watch a diarrhea becoming so severe that fat-absorption fails; on the contrary, we see a case in which fat-absorption is interfered with from the beginning and throughout the course, whether there be diarrhea or not.

The treatment nowadays adopted as a routine, namely, the rigorous withholding of fat in all forms, proves the same point. This surely is a recognition of the fact that celiac disease is due to a digestive fault not dependent upon gross changes in the organs.

The failure in the fat-absorption is constantly just what would occur if the bile-salts failed to act: always the fat in the intestine is prepared for the action of the bile-salts, but at that point the normal mechanism breaks down. Where diet is given which is approximately correct in fat-content, it is often found that the addition of bile-salts will quickly reduce the amount of fat in the dried feces, will lead to the passage of smaller and darker stools and perhaps to constipation, permitting the use of a richer diet. Bile-salts will not automatically put fat-digestion perfect in celiac disease; no one would claim that they could do so in a case of obstructive jaundice; but their good effect is quite noticeable if they are correctly used and compares very favorably with that of pancreas preparations in the treatment of pancreatic steatorrhea.

R. N. ANDREWS.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:
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THE CHOICE OF METHODS FOR MAKING LABOR EASY—Arthur H. Bill (Amer. Jour. Ob. and Gyn., vol. iii, p. 65): This author accepts the idea of the routine use of proper methods to eliminate the pain and discomforts of labor. He realizes the danger of the ultra-radical measures and in this article discriminates in the selection of methods. He considers: 1. Relief of pain. 2. Shortening of the second stage of labor. 1. Relief of pain. He uses morphine and scopolamine during the first stage, but withholds it during the second stage or within 2 hours of delivery. In multiparæ and many primiparæ general anesthetics, preferably ether with the closed cone, is extensively used. In 500 cases, methods were used as follows: Ether alone in 288. Morphine, scopolamine, plus ether in 192. Morphine, scopolamine, plus nitrous oxide in 19. Nitrous oxide and ether in 56. Nitrous oxide alone in 5. 2. Shortening labor. The author approves of almost routine intervention provided such measures are limited to the second stage. The article does not indicate what he considers as test of labor, but judging from the figures given it can not be at all arduous to the patient or obstetrician.
500 cases were delivered as follows:

High forceps, 41, including 32 occiput posterior converted by forceps.
Medium forceps, 81, including 40 occiput posterior converted by forceps.
Low forceps, 236, including 6 occiput posterior converted by forceps.
Podalic versions, 71, including 52 occiput posterior converted by forceps.

130 total

Breech extract, 19.
Abdom. Cesarean, 26.
Vag. Cesarean, 3.
Pubiotomy, 3.
Craniotomy, 1.
Spontaneous birth, 19.

Fetal mortality 9, or 1.8 per cent stillbirths and 7 or 1.4 per cent in first 2 weeks. The author does not select the exact method of delivery till his patient is anesthetized in most cases. At this time any abnormality of position is corrected and the simplest operation for delivery is then selected.

ARCHIBALD L. McDONALD.

THE PRESENT STATUS OF OPERATIVE OBSTETRICS REFERRING TO THE ABUSE OF CESAREAN SECTION—J. O. Polak (Surg. Gyn. and Ob., vol. 85, p. 566): This address given before the American College of Suregeons in 1921 well represents conservative ideas in obstetrics. It is an able protest against the more radical teaching and is an excellent presentation of results of "aseptic intelligent expectancy." In the author's series of 1,000 cases operative intervention was undertaken as follows: Forceps low and median 22. Version, internal or bipolar, 5. Induction of labor by bag, 4. Manual conversion of face to vertex, 2. Perforation of the aftercoming head, 1. Cleidotomy, 1. Cesarean section, 8. There were 19 stillbirths or a fetal mortality of 1.9 per cent. To this should be added 6 more babies which died during the first two weeks, giving a total mortality of 2.5 per cent. The series included 106 patients with contracted pelves, 344 with occiput posterior at the onset of labor, and 42 with abnormal presentation, including: 27 breech, 6 face or brow, 4 transverse, 4 sets of twins, and 1 complex with the head and cord presenting.

He does not advise premature induction of labor in contracted pelves because of added danger of infection, complications, premature rupture of membranes, abnormal position, or prolapse of the cord. Cases with relative degree of pelvic contraction should have an aseptic test of labor since 80 per cent may be delivered spontaneously or at most by low forceps. High forceps operations are condemned but low forceps under proper indications is purely life-saving. Version has a wider field than has been generally admitted but is not justifiable as an elective routine procedure in normal cases. Clean elective Cesarean section imposes a greater risk than that of operations for pelvic tumors, due to the presence of infective bacteria in the cavity of the puerperal uterus. Polak's studies indicate that the actual maternal mortality following Cesarean section ranges from 2.9 per cent to 14 per cent depending on the time in labor at which the operation is done, i e., after rupture of the membranes and vaginal invasion by examination or operation.

ARCHIBALD L. McDONALD.

STUDY OF PHYSICAL SIGNS OCCURRING IN A CASE OF PNEUMONIA OCCURRING AFTER A TRACHEOTOMY—Pallasse (Prog. Med., April 23, 1921, p. 197. Translation by E. H. Sirich): The present review may be of interest in relation to one published in these columns in October, 1922, an article by Rist. The author studied the physical findings in a case of pneumonia in a patient that had previously had a tracheotomy. The patient was made to breathe through the tracheal wound with the mouth and nose closed. The tubal sound did not disappear at this time, neither was the murmur greatly modified when he was made to breathe through the larynx with the wound closed. The author believes that the larynx plays a definite part in the production of respiratory murmurs but believes that the real cause of the various sounds is not yet well understood and that no definite conclusions can be drawn without further experimentation.

In one case observed by the reviewer the normal breath tones were not greatly changed when the patient was made to breathe first by one path and then by the other. Those interested in the transmission of respiratory and voice sounds are referred to studies made by Montgomery and Eckhardt published in the tenth report of The Phipps Institute.

T. A. PEPPARD.

ROENTGENOLOGY

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RELATIVE VALUE OF SURGERY AND ROENTGEN RAY IN THE TREATMENT OF HYPERTHYROIDISM—Edward P. Richardson (Jour. A. M. A., March 24, 1923): Thyroid disease may be classified on two bases, (1) function, and (2) pathological changes in the gland itself. On the first basis, there may be excessive, normal, or reduced activity, and on the second, hypertrophy and hyperplasia, the disposition of colloid, the presence of adenomas, of malignancy, or of inflammation. For the present, we are interested only in those cases of thyroid disease which show evidence of an associated constitutional disturbance, apparently due to a toxemia, and best explained by an increased output of thyroxin. Persistent increase in thyroid activity occurs, mainly, in conjunction with two types of changes in the gland itself, one a diffuse hyperplasia classified as hyperthyroidism and the other adenomatous change, classified as adenomatous goiter with hyperthyroidism.

Holmes and Merrill correctly believe that roentgen-ray treatment should be limited to cases which show symptoms

due to an increased function of the gland, while goiters with normal or reduced function, requiring treatment for deformity, pressure, potential malignancy, or potential hyperthyroidism should be treated by surgery only. The only exception is in cases of definitely inoperable malignancy.

The treatment of hyperthyroidism with the roentgen ray requires (1) modern equipment, with ability to measure dosage, (2) a frequent check on the degree of benefit by basal metabolism determinations, and (3) careful and accurate clinical supervision, with an open mind in regard to switching to surgical treatment if indicated.

Permanent reduction of the basal metabolism to within normal limits, ordinarily accompanied by marked improvement in subjective and objective symptoms is considered a "cure." However, permanent organic changes may have occurred, which neither surgery nor the roentgen ray can hope to relieve.

A comparison of fifty-eight cases of hyperthyroidism treated by roentgen ray, with thirty cases treated by thyroidectomy, both groups including exophthalmic goitre and toxic adenoma, shows that the average results in the surgical cases are better than in those treated by roentgen ray. The metabolism shows a drop to about plus 10 for the former, as compared with plus 20 for the latter; the pulse a drop to 80 as compared with 90; the weight a tendency to more persistent and greater increase.

The improvement in the cases treated by the roentgen ray was sufficiently sudden and striking to prove that the change was due to the treatment. In some cases, the results were brilliant; in no case did the patient grow worse. It is difficult to select cases in which good results should be obtained. Age, sex, and intensity of the hyperthyroidism seem to be unimportant. However, cases which are unsuitable are as follows: (1) In adenoma with hyperthyroidism, the cause seems to be within the thyroid gland, and it is logical to remove this cause surgically. Also, surgical results are excellent at the present time, in this type of case. (2) In the group of cases which show organic damage, particularly cardiac, the time consumed by roentgen-ray treatment may lead to further damage, with the chance of very little improvement in the hyperthyroidism at the end of this time. The economic situation may affect the choice. A wage earner may desire surgery because it is more rapid and certain, while a mother with small children would prefer the safer course of a series of roentgen-ray treatment. Although surgery at the present time is more effective in the average case, yet when the safe removal of a proper proportion of the gland has been accomplished, surgery has reached its limit. The roentgen ray, however, has the possibility of indefinite expansion, and future improvements in technique may lead to results as yet unobtained.

The chief advantage of roentgen-ray treatment is that its immediate mortality is nil. Certain minor advantages,—absence of discomfort of operative procedures, scar, and hospitalization—should have only slight consideration in the treatment of a serious disease.

Improvement is not temporary. A few cases show a rise in metabolic rate after a period within normal limits, but practically all of these have a second drop to normal. Rarely a case develops myxedema, usually temporary, and not definitely as a result of the treatment. In the cases studied, which came to operation following roentgen-ray treatment there was no appreciable increase in the difficulty of operation. The time required for treatment should be limited to four months, which is no longer than is often necessary in a several stage operative procedure. The most serious difficulty lies with those patients who are improved but not cured. Many of these refuse operation, although they are still thyrotoxic and surgery is indicated. A few cases abandon treatment before any improvement is obtained. If these had been operated, a complete cure might have been obtained for them.

A. W. DESJARDINS.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

ABDOMINAL PAIN. Norbert Ortner, M. D., chief of the Second Medical Clinic at the University of Vienna. Authorized translation by William A. Brams, M. D. and Alfred P. Luger, M. D. 362 pages. New York: Rebman Company, 1922.

IMPOTENCY, STERILITY AND ARTIFICIAL IMPREGNATION. Frank P. Davis, M. D. Second edition, revised and enlarged. 168 pages. St. Louis: C. V. Mosby Company, 1923. Cloth, $2.25.

CLINICAL LABORATORY METHODS. Russell Landram Haden, M. A., M. D. Associate professor of medicine, University of Kansas, Kansas City, Kansas, School of Medicine; formerly director of laboratories, Henry Ford Hospital, Detroit. 294 pages. 69 illustrations; 5 color plates. St. Louis: C. V. Mosby Company, 1923. Cloth, $3.75.

THE RIDDLE OF THE RHINE. Victor Lefebure, Officer of the Order of the British Empire, Chevalier de la Legion d'Honneur, Officer of the Crown of Italy, Fellow of the Chemical Society. Preface by Marshal Foch and introduction by Field-Marshal Sir Henry Wilson, Bart. 282 pages. Illustrated. New York: E. P. Dutton & Company, 1923.

THE PATIENT'S VIEWPOINT. Dr. Paluel J. Flagg, author of "Art in Anesthesia." 182 pages. Milwaukee: Bruce Publishing Company, 1923. Cloth, $1.30 net.

THE FORM AND FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM. Frederick Tilney, M. D., Ph. D., Professor of Neurology, Columbia University; Attending neurologist, Presbyterian Hospital and New York Neurological Institute; Consulting neurologist, Roosevelt Hospital, New York; and Henry Alsop Riley, A. M., M. D., Associate in Neurology, Columbia University; Associate attending neurologist, New York Neurological Institute; Attending physician neurological department, Vanderbilt Clinic, New York. Second edition. 1,019 pages. 591 figures, 763 illustrations, 56 colored. New York: Paul B. Hoeber, 1923. Cloth, $12.00.

NURSERY GUIDE FOR MOTHERS AND NURSES. Louis W. Sauer, M. A., M. D., Senior attending pediatrician, Evanston Hospital; formerly attending physician, Chicago Infant Welfare, and assisting attending physician, Children's Memorial Hospital, Chicago. 188 pages. Illustrated. St. Louis: C. V. Mosby Company, 1923. Cloth, $1.75.

LEGAL MEDICINE AND TOXICOLOGY. By many specialists. Edited by Frederick Peterson, M. D., Manager Craig Colony for Epileptics; Walter S. Haines, M. D., late Professor of Chemistry, Materia Medica and Toxicology, Rush Medical College; and Ralph W. Webster, M. D., Assistant Professor of Medical Jurisprudence, Rush Medical College. Second edition. Two octavo volumes, totaling 2,268 pages, with 334 illustrations, including 10 insets in colors. Philadelphia and London: W. B. Saunders Company, 1923. Cloth, $20.00 net.

PRACTICAL LOCAL ANESTHESIA AND ITS SURGICAL TECHNIC. Robert Emmett Farr, M. D., F. A. C. S., Minneapolis. 219 engravings; 16 color plates. 529 pages. Philadelphia and New York: Lea & Febiger, 1923. Cloth, $8.00.

NON-SURGICAL DRAINAGE OF THE GALL TRACT: a Treatise Concerned with Digestive Treatment of Certain Diseases of the Biliary and Allied Systems, in their Reaction to Gastro-Enterology and General Clinical Medicine. B. B. Vincent Lyon, A. B., M. D., chief of Clinic, Gastro-Intestinal department of Jefferson Hospital; Associate in Medicine, Jefferson Medical College; attending physician, Methodist Episcopal Hospital, Philadelphia. 175 engravings; 10 colored plates. 640 pages. Philadelphia and New York: Lea & Febiger, 1923. Cloth, $10.00.

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